# The Chemical Age

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## Speculation about Dyestuffs

IN the continued absence of any authoritative announcement of Government policy, speculation as to the future of the Dyestuffs Act goes merrily on, and a good deal of the discussion moves round the old familiar circle. It is difficult to forget that people who are now, in the interests of the textile industry, in the north especially, demanding that this pernicious legislation should be wiped off the Statute Book are the very people who ten years ago, when their trade and livelihood were threatened with extinction by the sudden cutting off of supplies of foreign dyestuffs, were declaring that never again would this country be so foolish as to put herself at the mercy of the foreign producer, and demanding that, at any cost and any sacrifice, Great Britain must for the future have a sufficient dyestuffs industry of its own.

Well, in the comparatively short period of ten years, this country has actually established a dyestuffs industry—not sufficient, it is true, for every need, for the rarer and more difficult classes of dyes do not spring up like mushrooms, but complete beyond what anyone would have dared to hope when the Act was passed in 1920. The cheerfulness with which it is now proposed to forget all the experiences on which the Act was based is not quite convincing. Nor can the description of the ill-effects of the measure be accepted as quite judicial. It has been shown again and again how fractional is the cost of the dyestuffs used in proportion to the total cost of the finished fabric, whereas one might imagine that the colour cost was the principal deciding factor in the textile industry, and that it was the cause of the present depression in the Lancashire and Yorkshire trade. All this scarcely falls in with the colour users' own decision that, when the price factor was reduced, the effects were so fractional that it was impracticable to pass on the benefit to their customers.

There may, it is true, be a case for not renewing the Act at all or for only a partial renewal, but the matter cannot be decided in the off-hand way that some of the controversialists favour. The decision, if it is to be sensible and fair, must take account of a considerable group of facts that require to be carefully examined and estimated. The President of the Board of Trade has given repeated assurances that this shall be done before any final decision is reached. In the calmer non-political atmosphere of the British Association next month, there is to be, we are glad to see, an exhaustive discussion on the present position of the British dyestuffs industry under the chairmanship of Dr. G. T. Morgan, head of the Chemical Research Laboratory at Teddington, as President of the Chemistry Section. Professor Green, as good an authority as could possibly be selected, will open the discussion with an historical survey of the industry since 1901, adding, no doubt, some opinions on future developments. He will be followed by Professor Jocelyn F. Thorpe, Mr. James Morton (Scottish Dyes, Ltd.), Mr. Tom Taylor (representing pigment makers), Mr. John Rogers and Mr. C. J. T. Cronshaw (representing the I.C.I. and B.D.C.), Sir Joseph Turner, Sir William Pope, and Mr. W. J. U. Woolcock (chairman of the Dyestuffs Development Committee). So representative a symposium should be really valuable, and the organisers may be congratulated on including so interesting and important a feature in the programme of the Chemistry Section.

## Sweetening the Land

ORDERLY rows of white heaps on the fresh brown soil. As we motor past it seems as if some giant child had been playing, and put them there; the farmer is limeing the land! At home in the armchair, repicturing what we have seen, we think of the antiquity of the custom, of the benefits of lime to the soil, of lime and what it means to the chemical industry, of causticity, and, lastly, of chalk itself and the myriads of little animals which have lived their short lives and contributed their dead *debris* to the building, *inter alia*, of the white cliffs and green downs of our Southern England, which Chesterton has said, "is not only a grand peninsula and a tradition and a civilisation;

it is something even more admirable. It is a piece of chalk!"

The agricultural chemist has long since taught us that, of the methods of improving the soil other than actual manuring, the incorporation of lime is the most important. Though it supplies no food to the plant, it sets in action the dormant residues of the soil, calcium replacing potassium in double salts and making more potash available; phosphoric acid is liberated, the neutral reaction of the soil is maintained. Besides its chemical action, lime has a physical effect upon the texture of stiff soils, giving them a coarser texture, making them warmer. All this is so well known and proven, and yet thousands of acres in Britain, as the farmers say, are thirsting for lime: many have not been limed since the days of the Romans. Everywhere are old abandoned lime kilns, the only signs of a vanished industry. At one time, for instance, a thriving trade existed in bringing limestone from South Wales to Appledore and the North Devon ports to be burnt in kilns close to the river—it is told that on the first of the ebb there were rarely less than 40 or 50 local vessels going to sea over the bar!

The lime industry is to-day centred in fewer hands, making primarily for the chemical and building trades, so that the small local kiln has no chance of existing. Perhaps transport charges make the conveyance of this lime to the more remote agricultural districts impossible; something seems wrong if, as Dr. Levinstein says, we could produce additional hay to the value of seventy million pounds a year if our fields were properly looked after.

By the chemist lime must be venerated as the origin and source of causticity, of the mysterious hydroxyl radicle about which so little is known, in spite of all the writings of the ionic school. It is true hydroxyl attached to the benzene ring appears in coal tar, and, sometimes tamed by methylation, in many plants products, but the only genuine article is the active half of hydrated lime and of the countless tons of caustic soda made from it. The salt and water splitters may boast of their independence of lime, but until we learn how to use or waste more chlorine they are but minor producers of hydroxyl. The origin and transformations of chalk make, in truth, a wonderful story; and there is the sound of the sea through it all.

## The New Nitrogen Agreement

THE agreement reported to have been reached in Paris between European producers of synthetic nitrogen and Chilean nitrate interests provides for the regulation of prices, production, and the allocation of markets between the different countries. The convention, so far as it affects European producers, will run for one year as from July 1 last. Each producer will retain his home market and export trade will be governed by quotas. France, whose output of synthetic nitrogen is insufficient for her domestic needs and who is not therefore at present interested in export, is the only European country outside the agreement. But for the anti-trust laws, the revision of which has been more than once suggested by American writers, the United States would probably have been a party to the arrangement. Even now, without being officially associated with the restriction pact, American producers may still adopt the policy of limiting their production to present requirements.

The scheme of output restriction will affect a certain number of nitrogen works and may even result, temporarily at least, in closing some down. This is so far recognised as inevitable that a compensation fund of £3,000,000 is being constituted, £750,000 being contributed by the new Cosana company, representing the Chilean producers, and the remaining £2,250,000 by the synthetic producers. While Chile will be expected to observe a fixed price level, there appears to be no restriction on her production, and with the wider adoption of the Guggenheim process, the elimination of uneconomic workings, and the general rationalisation of the industry, the Chilean nitrate industry would appear to have greatly improved prospects. The synthetic industry, for the moment, must feel the effects of restriction, wise though these measures are, but within a year or two, it is confidently predicted, its position and prospects will have greatly improved.

## Two Blair Fellowships

IT is interesting to note that the two most valuable scholarship awards in the gift of the London County Council, Robert Blair Fellowships of £450 each, have gone to students who intend to prosecute chemical and chemical engineering studies. Mr. Cyril H. Bowden, of Felixstowe, proposes to study chemical engineering at the Massachusetts Institute of Technology, Boston, U.S.A. Mr. Philip Carpenter, London, intends to visit mines in the United States to study the principles and practice of the flotation process for separating minerals from their ores, with a view to investigating the value of its application to the large copper field now being opened up in Northern Rhodesia. It will be noted that both Fellows have selected the United States as their field of research. The "Boston Tech." is, of course, known to everyone familiar with technological studies. Of the progress of the flotation process in the United States we have given examples from time to time, and the advantages that have resulted from its use there might equally well be enjoyed by the mining enterprises in our own Empire

### Books Received

PYROLYSIS OF DIAZOAMINO-*p*-TOLUENE. By Gilbert T. Morgan and Leslie Percy Walls. Reprinted from the *Journal of the Chemical Society*.

THE MICROBIOLOGY OF STARCH AND SUGARS. By A. C. Thaysen and L. D. Galloway. London: Oxford University Press. Pp. 336. 25s.

## The Calendar

| | | |
|---|---|---|
| Sep. 3–10 | British Association for the Advancement of Science | Bristol. |
| Sep. 29 to Oct. 1 | Faraday Society: General Discussion: "Colloid Science Applied to Biology." | The Laboratory of Physical Chemistry, Free School Lane, Cambridge. |
| 22 & 23 | Institute of Fuel: Conference. | Institution of Electrical Engineers, Lecture Theatre, Savoy Place, London. |
| 31 | Institution of Chemical Engineers: "The Chemistry of High Pressure Reactions." Professor W. A. Bone. | London. |

# The Safe Handling of Poisonous Chemicals

## By J. P. Rogers

*The dangers attached to working amongst and handling poisonous and corrosive chemicals, the symptoms of attack, and some preventive and remedial measures which should be taken, are outlined in the following article by Mr. J. P. Rogers. The concluding instalment will appear next week.*

It is said that "Familiarity breeds contempt." Those who handle corrosive and poisonous chemicals often neglect to take the necessary precautions to safeguard their own health and save others from unnecessary suffering and inconvenience. Unskilled labour, if not under strict supervision, is a source of danger. No person should be engaged on any process where the handling of chemicals is likely to affect his health without being first instructed in the nature of the dangers and the precautions to be taken. Accidents cannot be entirely prevented, but they can be reduced to a minimum if safety devices are installed by the employer and the employee is compelled to use them. Among some workers there is a personal pride in taking risks. This should be discouraged immediately it is noticed, as such men are a danger and an expense.

### Toxic and Corrosive Fumes and Gases

Fumes, vapours and finely divided chemical dust, owing to the ease with which they enter the body system, constitute the greatest danger in manufacturing and handling; substances that are blood poisons and are easily absorbed through the unbroken skin form another type. Finally, there are the corrosives and those whose action is mainly local.

Some gases and fumes, *e.g.*, chlorine, ammonia, oxides of sulphur, though very corrosive, are, fortunately, so irritating that the worker takes reasonable care not to breathe them for any length of time and, unless the attack is very sudden and concentrated, they do not cause much trouble. A cloth moistened with soda solution is often used by workers as a protection against small concentrations of acid fumes.

Chlorine has been a source of annoyance in chemical works and, to the surrounding community. Workers in chlorine factories are singularly free from influenza and common colds. A concentration of 0·0000015% breathed for an hour or so each day, small though it is, has been found to be effective both as a preventative and a curative of colds and influenza, but a concentration of 0·04% has been recorded as fatal, death being caused by suffocation. Even when largely diluted with air it is extremely disagreeable, as it acts rapidly upon the mucous membrane of the nose and throat, causing irritation and inflammation, which results in severe catarrh. Bromine acts similarly, and in addition has a corrosive action upon the skin.

Hydrogen sulphide is found in many industries, *e.g.*, gas production, petroleum refining, and in the air of analytical laboratories. This gas is more dangerous than most people imagine, being comparable to hydrocyanic acid for toxic properties. Concentrations as low as 0·005% will produce toxic symptoms, and continued exposure for several days to a concentration of 0·02% will cause death. It resembles carbon monoxide in rapidity of action if in higher concentrations, as the gas is then odourless and can only be detected by a sweet taste. When very largely diluted with air it gives rise to dizziness and headache.

### Carbon Monoxide

Much has been published of late years about carbon monoxide poisoning. This gas is given off in many incomplete combustions, and it is the toxic gas in the fumes from blasting charges. The worker's inability to sense its presence is the real danger, since the first indication may be a headache or a feeling of weakness. Larger doses will cause unconsciousness and death. It is well known that carbon monoxide possesses a greater affinity for the hæmoglobin of the blood than oxygen, hence the victim suffers from want of oxygen and the treatment of such a case is similar to that of a drowning person. Carry the patient to the open air, apply warmth and if necessary (the breathing having become shallow or ceased) apply artificial respiration (Schäfer's method) immediately and continue until normal breathing is restored. Administer oxygen if available. Carbon monoxide indicators, which do not require a knowledge of chemistry for their use, are procurable, and they should be carried wherever this deadly gas is suspected or likely to occur. The Universal Gas Mask used in various industries contains a special mixture of copper and manganese oxides, which catalyses the reaction $2CO+O_2=2CO_2$ at ordinary temperatures, thus preventing the poison from entering the lungs of the wearer.

Nitrous fumes are evolved during many processes in which nitric acid is used, *e.g.*, explosives, dye and drug intermediates. They are dangerous to inhale, as in small quantities they blister the lung tissue, larger quantities produce fluid in the air passages and suffocation results. Several hours may elapse before suffocation is complete and the amount of damage done cannot be ascertained. Administration of oxygen is useless owing to the action of the fumes on the blood corpuscles. Ammonia in small quantities helps to minimise the effect, but immediate medical attention is necessary to prevent fatal results.

Methanol, methyl alcohol, largely used in the preparation of dyes and varnishes, should not be inhaled. It is the most dangerous of the alcohol family. One drachm of the liquid swallowed may cause permanent blindness. The vapours of formaldehyde are highly corrosive internally.

Chlorinated hydrocarbons used largely as solvents are dangerous when inhaled. Westron (acetylene tetrachloride), which is used in the artificial silk, waterproofing, and varnish trades, gives off a toxic vapour, the continuous inhaling of which leads to liver degeneration which may prove fatal. Westrosol (trichlorethylene) used in oil and fat extraction, is also toxic. Carbon disulphide and carbon tetrachloride fumes are narcotic in their action.

### Powerful Poisons

Hydrogen cyanide (prussic acid) is so well known as a deadly poison that every precaution is usually taken when handling it. Most of the derivatives are intensely poisonous and should not be allowed to touch the skin. The isonitriles are also powerful poisons.

Nicotine is much used in horticulture as an insecticide and is applied by spraying or by vaporisation. It is a very powerful poison, two drops having been recorded as fatal when taken internally. Any preparation containing it should be handled with care, as it is easily absorbed when in contact with the skin. Repeated doses of tannic acid are helpful. Give coffee or strong tea and keep the victim warm. If necessary apply artificial respiration with oxygen.

Yellow phosphorus fumes lower the vitality of the worker through a decayed tooth or the seat of one recently extracted and tuberculosis of the part is likely to set in—the so-called "phossy jaw." If fumes are about, spray the atmosphere with turpentine and wear a respirator. The solid should not be touched with the fingers. Red phosphorus should be used wherever possible.

The volatile organometallic compounds are dangerous to inhale, or if allowed to remain in contact with the hands. Lead tetraethyl petrol should be used for fuel purposes only.

Many of the intermediates used in dye and drug manufacture are blood poisons. Benzene poisoning is caused through breathing benzene vapours, as the unbroken skin is not penetrated by the liquid. There is immediate collapse, difficulty in breathing, and the result may be fatal. Continued small doses will produce chronic anæmia and each exposure lessens the body resistance to future exposure. Alcohol increases the sensitivity, hence the worker should abstain from alcoholic drinks. Fresh air and rest are necessary for recovery; coffee acts as a stimulant. Benzene is usually handled in closed systems and is pumped from place to place; in consequence, there are few cases of poisoning by the vapours. When it becomes necessary to enter a tank or apparatus to effect repairs, the danger is great, and the work should only be done after thoroughly steaming out, filling with water to drive out any benzene vapours, withdrawing the water and allowing fresh air to take its place. Provision should be made for the workman to be pulled out should he be overcome.

(*To be concluded*)

# Industrial Disease Among Chemical Workers

## Annual Report of Senior Medical Inspector

*The report of the Senior Medical Inspector (Dr. T. C. Bridge) dealing primarily with workers who come into daily contact with lead, phosphorus, mercury, arsenic, etc., or are exposed to poisonous fumes or gases, forms an important section of the Annual Report of the Chief Inspector of Factories and Workshops for 1929. Details are given of the various cases of industrial disease, and of the steps which are being taken to bring about greater safety. Last week we published some extracts from the earlier sections of the Inspector's Report which can be obtained from H.M. Stationery Office, price 2s. 6d. net.*

THE following table gives particulars of the notification of the principal sections of industrial poisoning or disease during 1929, with figures for comparison with the last four years and the years 1900, 1910 and 1920. (The principal figures relate to reported cases, the small raised figures to deaths.) :—

| DISEASE AND INDUSTRIES. | Reported Cases | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1929 | 1928 | 1927 | 1926 | 1920 | 1910 | 1900 |
| Lead Poisoning | $244^{31}$ | $326^{43}$ | $347^{35}$ | $332^{46}$ | $289^{44}$ | $505^{38}$ | $1058^{38}$ |
| Phosphorus poisoning | — | — | — | — | — | — | 3 |
| Mercurial Poisoning | — | 4 | $3^{2}$ | $4^{1}$ | 5 | $10^{1}$ | 9 |
| Arsenical Poisoning | — | $2^{1}$ | $3^{1}$ | $5^{3}$ | 3 | 7 | $22^{3}$ |
| Carbon Bisulphide Poisoning | 6 | 1 | — | 1 | — | — | — |
| Aniline Poisoning | 26 | 41 | $38^{1}$ | $33^{1}$ | — | — | — |
| Chronic Benzene Poisoning | 1 | — | — | 1 | — | — | — |
| Toxic Jaundice | $2^{1}$ | 6 | 3 | 2 | $6^{3}$ | — | — |
| Epitheliomatous Ulceration | $165^{50}$ | $175^{59}$ | $174^{49}$ | $187^{49}$ | $45^{1}$ | — | — |
| 1. Pitch | $53^{1}$ | 32 | $34^{1}$ | 49 | 32 | — | — |
| 2. Tar | $34^{12}$ | $36^{19}$ | $24^{8}$ | $27^{14}$ | $10^{1}$ | — | — |
| 3. Paraffin | 4 | $2^{1}$ | 6 | 2 | 3 | — | — |
| 4. Oil | $74^{35}$ | $105^{38}$ | $110^{40}$ | $109^{35}$ | — | — | — |
| Chrome Ulceration | 109 | 70 | 65 | 55 | 126 | — | — |
| 1. Manufacture of bichromate | 13 | 3 | 12 | 2 | 77 | — | — |
| 2. Dyeing and finishing | 24 | 28 | 25 | 33 | 43 | — | — |
| 3. Chrome tanning | 1 | 4 | 7 | 2 | 4 | — | — |
| 4. Other industries | 71 | 35 | 21 | 18 | 2 | — | — |

Excluding 75 cases of lead poisoning occurring among painters of buildings, the remaining number (169) is the lowest recorded since notification under the Factory and Workshop Act came into force, with the exception of the year 1918—an abnormal year as regards the use of lead in industry. With whatever strictness regulations are drawn up, their full effect cannot be achieved unless there is close supervision to ensure that they are observed in detail, and in no manufacture is this more important than in pottery and electric accumulators. The action taken by one of the largest electric accumulator works in this country may be said to have confirmed this view. Following the appointment of a whole-time Medical Officer two years ago, no case of lead poisoning has been notified from these works, although numerous cases had occurred previously. Throughout the whole industry there have been only 23 cases recorded.

### Carbon Bisulphide Poisoning

In the early part of the year, states Dr. Bridge, he was asked by the District Inspector, to visit an artificial silk works with him, as, on the previous day when inspecting this factory he was concerned not only by the conditions existing in the churn room, but also by the appearance of the men working there. Of three men engaged on the shift two were suffering from well-marked symptoms of chronic carbon bisulphide poisoning ; the third, who had only worked ten shifts, was unaffected. Another man, who had been employed in the churn-room until three weeks previously, was also examined, and found to be more seriously affected. The cause of these unfortunate cases was due to the poor construction of the churns and the method adopted for removing the surplus carbon bisulphide before emptying, which consisted of blowing air into the churn with an escape to outside. The churn lids not fitting accurately, the carbon bisulphide was to some extent evacuated into the churn room. Proceedings were taken against the firm for failing to notify the cases of poisoning, and for not providing efficient ventilation, and a conviction was recorded.

In view of these cases all the artificial silk works were visited and as many as possible of the churn room men examined. No definite cases of carbon bisulphide poisoning in the other works visited were found, but several cases with some indication of absorption were noted. As a precautionary measure periodic medical examination was arranged for in all the works, and is being continued.

At a subsequent date, at the factory referred to above, a man developed acute mania after working in the churn-room for only 17 days, three days after being examined at the routine medical examination. The attack was severe and necessitated his removal to the mental hospital.

### Fewer Cases of Aniline Poisoning

Reported cases of aniline poisoning numbered 26, a reduction of 15 as compared with last year. In spite of the more continuous and higher temperatures prevailing, the cases were fairly evenly distributed throughout the year. There were no fatalities for the second year in succession, and this encourages one to hope that the danger of absorption through the skin, which in the past has been responsible for frequent severe cases of anilism, is now being conquered. The cases occurred in the following processes and call for no special comment : Making intermediates (D.N.B., D.N.T., T.N.T.), 9 ; making aniline colours and dyes, 7 ; aniline black dyeing, 1 ; paranitraniline powder, 2 ; toluidine, 3 ; splashing of aniline oil, 2 ; others, 2.

Dr. Henry attended an inquest on a man aged 51, employed in a synthetic dyeworks, who, having been associated with sodium naphthionate for 13 years, and then numerous substances including dinitrochlorbenzene, aniline, phenyl-glycine and formaldehyde for two to four years, contracted cancer of the urinary bladder. The growth was successfully removed, but 14 years later a second primary growth manifested itself, which caused death.

The question whether workers engaged in the manufacture of synthetic dyes are specially liable to cancer of the bladder is one which closely concerns the Factory Department, and arrangements have been made for the Department to co-operate in the research which has been proceeding for some time in connection with this matter. The research is, however, a difficult one and it is not possible to forecast when conclusive results may be obtained.

### Benzol, Xylol and Toluol

Examination of workers exposed to benzol, xylol and toluol, together with blood films, has been made. Up to the present it has not been possible to obtain examples of exposure in industry to pure samples, but it is generally held that xylol and toluol are somewhat less toxic than benzol. A mixture containing benzol (*i.e.*, 84 per cent. benzol, 13 per cent. toluol and 3 per cent. xylol), with acetone and methylated spirit, was found in the manufacture of artificial leather to have given rise to changes in the blood of workers employed for long periods, *i.e.*, 22 and 36 years, although from clinical examination there was little evidence of injury to health. The solvent mixture consisted of 52·6 per cent. benzol (90 per cent.), 15·8 per cent. acetone and 31·6 per cent. methylated spirit. The ventilation in the proofing process admitted of improvement.

" Xylol," probably in this instance a mixture with toluol and benzol, in use for a photogravure process, gave rise to symptoms of nausea and dizziness on the part of young workers in a poorly ventilated room. No changes in the blood were noted, but the longest period of employment was one month. " Commercial toluol," given as 80 per cent. toluol, 15 per cent. benzol and 5 per cent. xylol, but evidently varying considerably within these limits, gave rise in a rubber solutioning process with inadequate ventilation to some evidence of ill-health resembling that of chronic benzol intoxication, and examination of blood films confirmed clinical findings.

Two cases of toxic jaundice were notified, one due to the inhalation of the vapour of tetrachlorethane terminating fatally ; the other, from handling trinitrotoluol, was a slight case and made a complete recovery. In the fatal case, examination of five workers employed in the same room, was made and of others previously employed, some of whom had been engaged on the dipping process for several months ; but no signs of ill-health were observed. Similar works where there was a possibility of tetrachlorethane being used, were subsequently visited, with negative results.

### Chrome Ulceration

The number of cases of ulceration of the skin due to chrome is larger than in previous years. The increase of chromium plated articles of all sizes and descriptions must be apparent to all who note the finish of metal parts of motor cars and house furnishings, and it is from this source that the cases have mainly arisen. The effects of chromic acid or chromium compounds are local, affecting either the skin or mucous membrane. With due care on the part of the employer and the employed, the localised effects on the skin and mucous membrane can be to a great extent avoided. The precautions necessary may be summed up as follows:—Localised exhaust ventilation to remove dust or spray; suitable protective clothing, and attention to all minor accidents.

Cases of chrome ulceration in the manufacture of bichromates, with one exception, occurred in the first six months of the year at a factory commencing manufacture. A cutting fluid to prevent incrustation of debris from surface grinding on cast iron, introduced from abroad, was tried by one firm. This solution contained a small percentage of potassium bichromate. After a fortnight the man engaged developed ulceration of the skin.

The distribution of the cases of epitheliomatous ulceration in relation to the causative agent is given in the following table:—

| Causative Agent and Industry. | 1925. | 1926. | 1927. | 1928. | 1929. |
|---|---|---|---|---|---|
| *Pitch and Tar:*— | | | | | |
| Patent fuel works .. .. | $25^{3}$ | 27 | 20 | 20 | $27^{1}$ |
| Tar distilling .. .. .. | $23^{4}$ | $18^{3}$ | $14^{1}$ | $23^{4}$ | $36^{3}$ |
| Gas works .. .. .. | $9^{2}$ | $15^{9}$ | $14^{5}$ | $17^{13}$ | $16^{10}$ |
| Other industries .. .. | 6 | $16^{2}$ | $10^{3}$ | $8^{2}$ | $8^{1}$ |
| *Paraffin:*— | | | | | |
| Shale oil works .. .. | 4 | 2 | 6 | $2^{1}$ | 4 |
| *Mineral oil:*— | | | | | |
| Cotton mule spinning .. .. | $78^{35}$ | $88^{20}$ | $101^{31}$ | $101^{36}$ | $54^{24}$ |
| Other industries .. .. .. | $15^{11}$ | $21^{15}$ | $9^{9}$ | $4^{3}$ | $20^{11}$ |
| Total .. .. .. .. | $160^{53}$ | $187^{49}$ | $174^{40}$ | $175^{59}$ | $165^{30}$ |

### Fumes and Gases

The reported cases of gassing are given in the table below, showing a comparison with former years:—

| | 1925. | 1926. | 1927. | 1928. | 1929. |
|---|---|---|---|---|---|
| Carbon monoxide .. .. .. | $118^{10}$ | $101^{8}$ | $88^{4}$ | $81^{9}$ | $113^{10}$ |
| (*a*) Blast furnace .. .. | $25^{6}$ | 9 | 13 | $22^{8}$ | $25^{5}$ |
| (*b*) Power .. .. .. .. | $34^{1}$ | $32^{2}$ | $19^{1}$ | 20 | $55^{3}$ |
| (*c*) Coal .. .. .. .. | $26^{2}$ | $26^{1}$ | $38^{2}$ | 14 | $21^{1}$ |
| (*d*) Other .. .. .. .. | $33^{1}$ | $34^{3}$ | $18^{1}$ | $25^{1}$ | $12^{1}$ |
| Carbon dioxide .. .. .. | $10^{2}$ | 4 | 3 | $8^{1}$ | — |
| Sulphuretted hydrogen .. .. | 4 | 3 | 9 | $9^{3}$ | $7^{2}$ |
| Sulphur dioxide .. .. .. | $3^{1}$ | 2 | $5^{1}$ | 10 | 6 |
| Chlorine .. .. .. .. | 12 | 13 | 14 | 17 | 14 |
| Nitrous fumes .. .. .. | $10^{2}$ | $5^{1}$ | 7 | $6^{1}$ | $11^{2}$ |
| Ammonia .. .. .. | 5 | $5^{1}$ | 5 | $12^{1}$ | 18 |
| Benzol, benzine, naphtha and petrol .. .. .. .. | $3^{1}$ | $4^{1}$ | $7^{2}$ | $7^{2}$ | 7 |
| Other (ether, acetone, nickel carbonyl, etc.) .. .. .. | $35^{3}$ | $17^{1}$ | $23^{2}$ | $17^{2}$ | $30^{1}$ |

The carbon monoxide cases are higher this year than for many previous years, the reason being due to cases which have occurred at a large works where water gas is used. Accidents from carbon monoxide are often very difficult to avoid, and while the number of fatalities is not high, the possibility of many non-fatal accidents becoming so is apparent. Accidents of this class can only be avoided by the greatest care and supervision. Workers must have impressed upon them the necessity of making every use of the appliances available—breathing apparatus, rescue lines, etc. "Familiarity breeds contempt," and employers should realise that workers, in order to carry out necessary work, often take risks they would hesitate to do if warned fully of the dangers. There is no accident more tragic than a fatal gassing by carbon monoxide, because, almost invariably, one has the feeling that with foresight it could have been prevented. Unfortunately, one man, overcome by carbon monoxide gas, in doing some simple job, jeopardises the lives of other men who attempt rescue. It is not sufficient to have appliances for rescue or resuscitation available: the workers should be instructed in their use. Every accident of this character, even slight cases, should be carefully inquired into by every person responsible and by those who actually do the work. In such a way a better sense of the danger of ordinary jobs would be established. If the results of such an inquiry had the fullest publicity, then those engaged on similar work might be in a position to anticipate and provide against similar accidents.

The five non-fatal sulphuretted hydrogen cases were due to escape of $H_2S$ in gasworks; three of them in emptying purifiers. The two fatal cases were of an entirely different character, and affected three men engaged on the enlargement of a cesspit on factory premises. The hydrogen sulphide gas accumulated during the night and arose from the decomposition of organic matter. No tests were made before descending the pit in the morning, and the first man to descend was immediately overcome and fell from the bucket in which he was being lowered. Brave efforts were made at rescue, and in these attempts another man also lost his life.

Fourteen chlorine cases were reported, none of which was fatal. Four of these were due to escape in artificial silk works; three to escape from bleach plants; and two to escape from a chlorine cylinder.

Of the eleven nitrous fumes cases (two fatal) reported, five (one fatal) were due to escape from nitric acid plant, two to escape from nitration plant; and three cases (one fatal) to evolution of nitrous fumes in cleaning copper or brass with nitric acid. In the fatal case a sponge respirator was provided. It cannot be too strongly emphasised that no protection is afforded by such a respirator.

### Ammonia

Ammonia accounted for eighteen non-fatal cases, twelve being due to escape from a new ammonia plant in a large chemical factory, and three to escape from refrigerator plants. At the factory where the twelve cases occurred, special precautions are taken and a safety service established, which includes the supervision of all breathing apparatus, and safety officers to supervise all work in which danger from this gas is likely to arise.

Six cases of poisoning by nickel carbonyl occurred at one works. Fortunately, none of the cases was serious and no permanent injury to health resulted, and the steps taken by the firm appear to be such as will prevent the possibility of a recurrence.

A severe case of poisoning by trichlorethylene arose in cleaning out the residue of a small tank in which this material had been used. The operation had been previously performed without ill-effects, and the firm, unaware of the narcotic properties of trichlorethylene, had not taken steps to prevent the inhalation of the fumes. In cleaning out such tanks, unless they are previously adequately ventilated, the worker should be protected with a helmet connected with a fresh air pipe line.

One operative who had been inhaling the fumes from Bakelite varnishing solutions containing formaldehyde, phenol and wood spirit during the day, was, the same evening, mentally affected. Delirium necessitated his removal to a mental ward of a hospital for two days. The same delayed effect has been noted elsewhere. Since ventilation has been installed no further ill-effects have been noted.

Two cases, one of which was fatal, occurred from the inhalation of ethylene-chlor-hydrin. The men were engaged in a vessel in which this chemical had been used.

In the artificial silk industry conjunctivitis affecting spinners in the viscose process has received very considerable attention. As far as information can be obtained, cases of conjunctivitis, while still occurring from time to time, have been considerably fewer in number. The relationship between outbreaks of cases and failure of the ventilation at the spinning frames has established, without doubt, that the remedy for this condition is localised exhaust ventilation to remove the gas generated by the action of the bath on the viscose. Gastritis resulting from work in the spinning room has been complained of, but so far as it has been possible to ascertain, there is no evidence that this condition is produced in artificial silk spinning nor in other departments of artificial silk works.

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### Italian Firm to Produce Solvents

Production of acetic anhydride, acetic acid and derivatives, has begun at the Villadossola plant of the Montecatini subsidiary, the Società Elettrochimica del Toce. The Montecatini concern announces its intention of developing a production of solvents not only to supply their subsidiary, the Società Italiana Duco, but in sufficient quantities to cover the increased demand of the domestic market.

# Chemical and Metallurgical Corporation

## Providing for Chemical Workers' Future

*Although the Chemical and Metallurgical Corporation have had many difficulties to meet, this has not prevented the Corporation from starting a Welfare Fund for the workers with a gift of £500. Mr. F. Arnatt (chairman of the company), who presided over the staff meetings at which the matter was discussed, referred in his speech to the conditions of competition to-day, and emphasised the need of retaining the goodwill of the workers and making adequate provision for their needs.*

THE chemical industry (Mr. Arnatt said) is subject to fierce competition and its development and very existence are governed by conditions over which we at Astmoor have no control whatever. We shall continue to exist here so long as we conform with trade conditions, and those conditions to-day demand high efficiency and low costs. Low costs in the chemical industry mean economy in labour. I will not be a party to any proposals to reduce wages—wages are too low now—but we have to face the fact that there is no room in a chemical works to-day except for workers, either out on the plants or inside in the offices. This is especially so in our case.

### Facing Competitive Conditions

We are a new company, and competition faces us on every side. We are making good progress and shall win through if we continue to get the co-operation of you all. The task is hard, but it is a task for men who have no use for slackness or inefficiency. We have yet much to achieve, but I assure you that no employees will be dispensed with unless I firmly believe that it is necessary for the welfare of the firm, and to say welfare of the firm is only another way of saying welfare of the employees.

Some of you might at one time have thought that this is all eye-wash, that our employees are merely tools to be discarded when no longer required. This is certainly not so with us. It is true that your efforts and suggestions for improvements may lead to others being dispensed with, and I know it may seem hard, but I do ask you to think a little of the other side, that your efforts will thereby have helped to make secure the jobs of your mates.

Another thing—do think of the 8,000 men and women, shareholders of this company, who have invested their savings, with the result that I frankly showed to you when I put up on the notice boards the company's balance sheet. Despite the showing of the past, through no fault of yours, some of the shareholders were persuaded to find another £100,000 to enable me to carry on and make a success of the business. I am going to make a success of it and I know you will not grudge the shareholders a reasonable return on their invested savings. But do not think that shareholders will get all the benefit. Continue to help me to make this company successful and I promise you that when the ordinary shareholders are receiving some return which they have had to manage without for so many years, you will not have to ask me to improve your lot. If I am still here, I shall be eager and determined to do it. I ask of you all your best. It is only by your co-operation that I can achieve the end I have in view—a stable, prosperous concern; a happy, contented band of helpers in the works; a concern that all of you can take pride in, a legitimate pride because you have all done your share towards its creation.

### A Works Welfare Scheme

I want, as soon as circumstances permit, to put into operation in this company a scheme under which every man who has worked for a certain time for the company, can, on reaching a fixed age, be sure of getting a pension of an amount sufficient to live on. My scheme, if this company is brought to the state of success which makes it possible, will not depend on the company having the money when the time comes; it will be worked through one of the big insurance companies and will therefore be safe. It is a horrible feature of our industrial system that men who are not in good enough health or who are too old to work efficiently should be cast off, as they are in most companies to-day, without any provision for the twilight of their lives. You must help me to make this firm one of the few who are able to act in a fairer way to those who have helped it to live and prosper. In all the changes made here nothing counts but merit and loyal service. We are a new concern, there are no records of long service, yet I think through all the changes, through all the reductions, we have already established this principle, that only merit counts.

I ask you to examine our record. Two and a half years ago we started up the hydrochloric acid plant with nine men—to-day eight out of those nine remain with us and four of them are on the staff. Two years ago we started up the first oleum unit with 18 men—those 18 men remain with us and six are already staff men. Even on the Glaubers plant, which is temporarily shut down, we started the plant with four men and the four are still here, other jobs having been found for them. What better record could I put before you? Whilst I remain in charge of this company I shall demand that reward follows only merit. I cannot do more.

I do not like benevolent schemes, or at any rate, the word "benevolent," because it smacks of charity. But there is little alternative for firms like ours and persons like myself, who genuinely want to do what can be done to make conditions of life more comfortable. This is because of the industrial system which has grown up in this country, and which is believed in to such an extent as to be regarded as sacred, and it is a system which keeps wages in this country at a low level.

### Cheap Foreign Products

In addition to the industrial system, we have free imports into this country. Any foreigners can send their surplus goods here, no matter whether produced under proper conditions or not, and this is the important thing, we have *got* to sell our stuff, and in so doing have to compete right here in our own country with these surplus foreign goods.

It is true that there is not so much direct foreign competition in heavy chemicals as there is in other lines, although there is some competition, but what is of vital importance is that our customers, the wire drawers, the bleachers, the casting manufacturers, the dyers and others, are all subjected to the fiercest of foreign competition, and they cannot sell even a reasonable part of their production capacity. This hits us heavily enough because if they cannot sell their goods they cannot buy from us the acids we make which are their raw material.

In order to sell at the low prices which competition has brought about, we must manufacture at the lowest rates, and the only firms that are likely to live are those that are the most efficient and because of their efficiency can produce at lowest costs, and are, therefore, able to offer goods at prices which will tempt buyers to give orders.

### Details of the Scheme

Now to get to details of our benevolent scheme. The principal object of the scheme is to have money available for granting to sick or injured employees, as an addition to the sum which is paid under National Health Insurance rules. A further object, to be achieved as soon as circumstances permit, is to provide first-class medical attendance for employees' wives and children, and later on to make grants in respect of any mishap or misfortune which means extra expenditure in the home. One thing I want to make clear, and that is that I regard this benevolent scheme as no more than a stepping stone to the establishment of a pension scheme which has nothing charitable about it, but comes to an employee as a right. For this reason we must be careful to include in the scheme only those employees who are really part and parcel of this chemical works, men whose future is definitely bound up with the firm's future. As to whether or not the scheme should be contributed to by employees, I have discussed this with one of the local trade union leaders who is emphatically of opinion that the scheme should be contributory. If the scheme is a contributory one, it must be on the basis that if for any reason a man leaves the company he must be paid back the whole of his own contributions after deducting any money paid to him, or on his behalf, out of the scheme. Another thing is that it is essential that everyone who is eligible should come into the scheme. The contribution should not be less than 6d. per week per employee and the same from the company.

It would not suit me if the scheme had to "start from cold," so to speak, with no funds in hand for dealing with

immediate necessities, and the question arises where is a nice round sum to come from to give the scheme a good start off? I am glad to tell you that the firm will make a free gift of £500 immediately the committee is ready to receive it.

### Welfare Scheme Approved

At a later meeting it was unanimously agreed to approve a welfare scheme on the following basis:—

(1) That the contribution of the employees be 6d. per week, inclusive of the present contribution to the Runcorn Hospital and Nursing Funds.

(2) That on leaving our employ or on death, the whole of the employees' contributions, less the 1½d. per week (being one-half of the proposed contribution to Runcorn Hospital and Nursing Services) and less any other cash received should be returned to the employee.

(3) That the £500 given to the Welfare Fund by the company (less grants made up to September 2, and less the sum required as cash in hand) should be invested forthwith to start a reserve fund.

(4) That 25 per cent. of the weekly income be invested weekly to add to the reserve fund.

(5) That 25 per cent. of the income be given to the local hospital and nursing services.

(6) That the statutory benefits immediately be: three days absence, no payment; first six weeks, £1 per week; next 12 weeks, 12s. per week. After the expiration of 18 weeks any further benefits would be considered by the Welfare Committee, under Clause 7.

(7) That the additional benefits, in cases of exceptional misfortune, to be paid at the discretion of the Welfare Committee, be limited to the sum of £150 in the first year.

## The Cheapest Library in the World

### Benn's "Sixpennies" Now Complete

THE trade and technical Press has never limited its activities to the publication of journals. From the earliest years its other forms of service to industry have included assistance to traders at exhibitions and conferences, the establishment of inquiry bureaux, and important efforts on behalf of technical education. It was in the last connection that Benn Brothers, Ltd., the publishers of THE CHEMICAL AGE, established at the beginning of this century a reputation for technical books, dealing with many branches of industrial science from the practical standpoint of the trader himself. Soon after the war the unprecedented demand for this class of literature made it necessary to entrust their production to a separate company, and Ernest Benn, Ltd., was formed in 1923. As the prospectus pointed out, its object was to issue books on science, technology, history and art at all prices from sixpence to forty guineas. There have not, it is true, been many volumes at the upper end of the scale; but at the lower end a record has been established by the Sixpenny Library, which is now completed by the appearance of Volume No. 150. Within three years nearly 2,000,000 copies have been sold.

Many of these sixpenny volumes are of direct practical interest to business men and industrialists. There are, for example, "The Introduction to Economics," by Mr. Henderson Pringle (Principal of the Birmingham Commercial College); "Railways," by Lord Monkswell; and "Banking," written by a director of Lloyd's Bank, Mr. W. W. Paine. Every title in the Science Section of the Library is of value to those engaged in research, the 48 volumes in this class including Dr. Percy Spielmann's important treatise on "Chemistry."

At the outset the Sixpenny Library was a revolutionary experiment. To present the views of the leaders in every branch of learning, in books specially written and at the price of sixpence a volume, was a departure that had never been attempted before in the history of publishing. Various series appeared before the war in which classic works were reprinted at cheap prices. Benn's Sixpenny Library was distinguished from these by its presentation of completely new material, written in every case by an expert, and in the plain language of the man in the street. Each volume contains 20,000 words, printed in clear type, and bound in card covers. The Library appeals to business men more than to any other class of the community, since it presents a summary of knowledge in a form specially suited to those whose leisure for reading is limited.

## British Acetate Silk Corporation

### A Reconstruction Scheme

CREDITORS and shareholders of the British Acetate Silk Corporation, Ltd., at a meeting in London on Friday, August 8, decided to appoint committees to confer with the directors in connection with a proposed reconstruction scheme.

Mr. Millard Tucker, who presided, said that the company had some very solid assets which were in a state of suspended animation at the moment owing to lack of working capital. The directors had been very anxious to obtain the finance necessary to pay the creditors, to put the business on the basis of a going concern, and to re-employ the 1,900 people they had had to put out of employment. Last December he told the shareholders that the company was short of money. That was brought about, roughly speaking, by the fact that the capital expenditure which it was estimated would have to be spent upon the plant was underestimated by approximately £500,000. In the second place, there had been a loss on the first twenty months' working up to September, 1929, of something like £200,000, and in addition the company had incurred a good deal of extra expenditure in connection with the factory itself, and dealing with the effluent from the factory.

It was necessary to find extra money, and they had obtained from the bank over half a million sterling, leaving approximately £300,000 to be obtained. The bank authorities later agreed to take what he considered was an unprecedented step of agreeing to the company raising a further £300,000 on debentures which would rank equally with the half a million found by the bank. That issue was about to be made when one creditor attempted to get a forced sale of the plant, or some of the assets at Stowmarket, through the medium of the Sheriff in the ordinary way. The directors recommended the bank to appoint a receiver, and that was done in the interests of everybody. The appointment of a receiver did not make the raising of extra money any easier, and some very important negotiations which were then pending with the representatives of a foreign Government for the erection overseas of a duplicate of the Stowmarket acetate silk plant, which would have been very satisfactory, and provided the company with a considerable sum of money, fell through. Following the appointment of the receiver, negotiations were opened up with a big American group. Whether anything would come of it he could not say. A reconstruction scheme would involve the liquidation of the company, and the formation of another to take over the business. It was proposed that the bank should lend the new company the same amount of money as it had lent the present concern, and the new company would pay off the debt owing by the old company to its bank.

A resolution approving the scheme of reconstruction was carried unanimously, and the shareholders appointed a committee of six to confer with the board.

### Allied Cement Co.

IN his report to the shareholders of Allied Cement Co., Ltd. at their annual meeting, the chairman, Mr. Oliver J. S. Piper, referred to the increased competition from foreign cement, pointing out that while foreign cement is cheaper to purchase than British cement, the British buyer is no longer able to save the difference, since he must, apart from the question of quality, pay in addition a sum to the British workman for not making it, in the shape of the purchaser's contribution to the cost of unemployment itself. If these facts were better appreciated by municipalities and contractors who are buying foreign goods because they appear to be cheaper, it would be of advantage to the cement industry of this country.

### American Borax Extracts

UNITED STATES exports of borax during the first four months of the current year were 32,640 short tons, compared to 23,632 tons for the first quarter of 1929. The export value per ton for the period shows a decline from approximately $39.10 in 1929 to $34.50 in 1930. This gain of 38 per cent. in tonnage of borax exports is interpreted as a favourable reception of lower prices on an essential commodity for many important foreign industries.

# A Bookman's Column

*Perfumes, Cosmetics and Soaps*, with special reference to synthetics, by W. A. Poucher, Ph.C., has run into a third edition (Chapman and Hall, 21s.). The fact will surprise no one familiar with the earlier editions, for the natural interest of the subject, the commercial importance of the raw materials dealt with, and the thoroughness of the author's treatment are quite sufficient reasons for the continued demand for this invaluable work. Volume I (revised and enlarged) is described as a dictionary of raw materials, together with an account of the nomenclature of synthetics. The author explains shortly that the incessant study of plants likely to yield volatile oils of pleasing odour and the continued research in the domain of aromatic chemicals are together responsible for a considerable increase in the number of perfumery raw materials during the past four years. In the present volume he has endeavoured to include all these new substances, together with such notes on their practical application as may be useful to perfumery chemists. Compared with the earlier edition there are some thirty more natural products and about 250 more synthetics, making in all a total of over 1,000 perfumery raw materials. The new features of this edition include the chemical formulæ and physical constants for nearly all the synthetics. The book is equally valuable from the scientific and practical sides.

* * *

Volume II of the *Dizionario di Merceologia e di Chimica Applicata* (Ulrico Hoepli, Milan, L. 60) covers the words Damiana to Mussena and runs to 1,096 columns, two to a page. The book is being revised, corrected and amplified by Prof. Dott. G. Vittorio Villavecchia, with the assistance of Professors Fabris, Rossi and Belasio, and the information is being successfully brought down to date, the tables in many cases giving the statistics up to the year 1928. Each article treats comprehensively the substance with which it deals, giving its chemical composition and characteristics, processes of treatment, commercial or other uses, sources and quantity of production, etc. The revision is being very thoroughly done and reflects equal credit on the editorial staff and the publishers.

* * *

The writings of the great German chemist, Georg Lunge, on sulphuric acid manufacture, published successively in 1879, 1893, 1909 and 1916, are not only standard but may truly be described as monumental. Our congratulations may freely be offered to Dr. Ing Bruno Waeser on his successful attempt to revise and bring up to date Lunge's famous work and to the publishers, Fried. Vieweg und Sohn Akt.-Ges., on their enterprise in issuing it. The full title is *Handbuch der Schwefelsäurefabrikation nach der 4 Auflage von Lunge's Handbuch der Schwefelsäurefabrikation bearbeitet von Dr. Ing Bruno Waeser.* It is published in three volumes—the first *Die Gewinnung des Schwefeldioxyds*, the second *Die Verarbeitung von Schwefeldioxyd auf Schwefelsäure (Bleikammer-und Turmverfahren)*, and the third *Die Verarbeitung von Schwefeldioxyd auf Schwefelsäure (Kontaktverfahren)*. The price for the three volumes is 195 marks (paper) and 204 marks (bound). Dr. Waeser has undertaken an onerous work, and has discharged it with rare thoroughness, application and knowledge. While the basic qualities of the original work have been retained, Dr. Waeser has brought the information down to a very recent period, so as to cover the newer developments and problems and to include the most modern authorities and the latest contemporary contributions on the subject. The work is liberally illustrated, is encyclopædic in its range and treatment, and is invaluable to everyone—chemist, technologist or manufacturer—interested in sulphur acid manufacture.

* * *

*Essences naturelles et Parfums*, by Raymond Delange (Librairie Armand Colin, Paris, pp. 222, 10.50 frs.), is a handy little text-book, which is warmly commended in a prefatory note by E.-E. Blaise as being both soundly scientific and yet not beyond the grasp of the cultured layman. After a short historical review of the science and industry of perfumery, there are chapters on odour in relation to the properties and molecular structure of flowers, etc., analysis, essential oils, alcohols, esters, aldehydes, etc. An excellent bibliography completes a sound, useful, and compact little treatise.

* * *

*Paint, Powder and Patches* is the picturesque and truly descriptive title of a handbook of "make-up" for stage and carnival by H. S. Redgrove and Gilbert A. Foan (W. Heinemann, Ltd., pp. 170, 7s. 6d.). We had no idea, before dipping into this interesting volume, what a considerable technique is involved in this ancient art of "make-up," and how important it is that the chemistry of the business should be broadly understood, if the risk of rashes and similar outbreaks is to be avoided. The authors have provided something of interest and use for all who favour the use of cosmetics, from the magnificent performer in grand opera to the young lady daintily powdering her nose in the morning 'bus. Even the most experienced should learn something from the many interesting things they tell the reader.

* * *

A work of considerable personal and political interest is promised from the Benn Press later in the year—*The Personal Papers of Lord Rendel*, who was known as Mr. Gladstone's most intimate friend during the last ten years of his life. Without being a diarist in the strict sense, Lord Rendel preserved the conversations of Gladstone and many other statesmen over a considerable period, and these, with his own notes and correspondence with literary people and politicians of the period, supply some vivid and intimate pictures of later Victorian politics and society. The papers have been edited for publication by Mr. F. E. Hamer, who had the advantage of personal association with Lord Rendel in educational and other public work.

* * *

Professor A. Findlay's *The Spirit of Chemistry* (Longmans, Green and Co., pp. 480, 10s. 6d.) is described as an introduction to chemistry for students of the liberal arts, and it follows appropriately on the author's earlier volume, *Chemistry in the Service of Man*. The book has been written as a text-book for students who pursue a course in chemistry as an element of general culture rather than as a part of their professional or technical training. Its appeal is mainly to the imagination and intellectual interests of those who are not destined for a scientific career but who desire to understand something of the intellectual progress of recent years and to gain some knowledge of a branch of science on which much of our present-day civilisation is based. Professor Findlay makes it all look quite easy and natural, so smoothly is the story told, and it is only on reflection that one realises how much he has managed to compress within the covers.

* * *

The conferences of the Faraday Society are recognised as of the most educational type, and the volumes containing the records of the papers and discussions are substantial additions to scientific literature. Two of these volumes deserve notice —*Optical Rotatory Power* (pp. 256-461, 10s. 6d.) opened and closed by Professor T. M. Lowry, with many contributions by acknowledged authorities, and *Molecular Spectra and Molecular Structure* (pp. 611-954, 15s. 6d.), with a general introduction by Professors Garner and Lennard-Jones. The organisation of these discussions is work of the highest scientific value and the Society deserves the warmest thanks for undertaking the considerable cost and trouble.

* * *

The Bureau of Economic Chemistry (New York) forwards the 1930 edition of the *Drug and Chemical Guide-book*, well-known in the American chemical industry. It includes a large amount of practical market information, such as a catalogue of American chemical firms, showing the products manufactured or handled by each; a buying guide for chemicals, drugs, dyes, etc., giving chemical and physical data, grades, types of containers and shipping regulations; a directory of the chemical and allied industries of the United States; container, packing and shipping guide; and price data and trade information. It is published in co-operation with *Chemical Markets*, a New York publication.

# Benn Brothers Annual Meeting

## Fifty Years of Unbroken Progress

THE thirty-fourth annual general meeting of Benn Brothers, Ltd., was held at Bouverie House, Fleet Street, London, on Friday, August 8. Sir Ernest J. P. Benn (Chairman of the company) presided.

The Chairman, in moving the adoption of the report and accounts, said that company meetings in these days, perhaps, had more than their usual interest. Some of his hearers who were interested in other companies might have experienced the feelings, all too common among shareholders, of those who had put their money into some promising industrial, had seen the business progress and then drift into a wild period of inflation and speculation and their sovereign become perhaps £5 or £6, and then had had to witness not only the disappearance of the inflation but even of the original property itself.

### A Wonderful Fifty Years

Benn Brothers were in a very different position. The company had had its full share of success. They had had a wonderful movement spreading not only over the last few years but over the whole of their career. There was, moreover, another very satisfactory feature in the figures before them. If they would examine the record of the last two or three years, it would seem as if they were succeeding in their task of stabilising their success at the high point reached two or three years ago. The business was on top at the moment, and it appeared to be staying at the top. It had been founded on fifty years of trading experience and twenty-five years of careful and very conservative finance. Thinking, as they did that day, of half a century of work, it was well to look back a little and view the concern's development as a solid institution. He quoted the following figures, as they stood at the end of each of the quinquennial periods 1905–1930:

| | 1905 | 1910 | 1915 | 1920 | 1925 | 1930 |
|---|---|---|---|---|---|---|
| | £ | £ | £ | £ | £ | £ |
| Issued capital | 10,000 | 10,000 | 50,000 | 94,876 | 126,203 | 222,662 |
| Revenue | 6,660 | 10,771 | 31,977 | 179,584 | 205,992 | 274,334 |
| Net Profit | 1,006 | 1,730 | 5,073 | 11,940 | 31,426 | 48,013 |

So that their revenues had multiplied in this twenty-five years 41 times, their net profit was 48 times larger, with the capital only 23 times as large. That was rather a striking report to make in justification of the conservative nature of the financial guidance of the business. As regards the profit and loss account and the balance sheet, these stood pretty much as before, the tendency being on the whole in the right direction.

### Bouverie House

As the report told them, they were meeting in Bouverie House with the feeling for the first time that every brick and nail in it belonged to them. The directors had managed to clear off this year the bank loan secured on Bouverie House.

The success of the company had been very largely due to the wise arrangement made many years ago by which a large portion of the profit after a 10 per cent. dividend had been paid was divided among some of their directors. It appeared that the agreement made with seven of their directors could be expressed in a better way. They were asked to approve an agreement that so far as he could understand made no difference whatever to the practice that had been followed ever since this arrangement was entered into and made no difference whatever to the remuneration of any of the parties concerned.

They were proud to think, as they stood in the midst of a depression that was supposed to be unprecedented, that every one of the journals upon which they relied was in as sound a position as ever. They had passed through their jubilee celebrations and in that connection he hoped that everyone had read and would treasure the story of the business as put together by Mr. John A. Benn. The remarkable telegram from the King congratulating the firm on its jubilee hung in the board room for the encouragement of those who would come after them. It had happened to coincide with the jubilee that they had had the joy of welcoming to the board of directors two more members of the staff, and one of them, Mr. F. E. Hamer, had since been raised to the Commission of the Peace. Miss Robinson had been for so many years intimately connected with the work of the directors that they had long felt her to be one of themselves. Another feature of their activities that had impressed him delightfully was the way in which the staff had assumed a position as a sort of godparent to the John Benn Hostel in Stepney. His hearers would be glad to know that the Prince of Wales had settled upon October 29 as the date when he would visit the Hostel for the long promised supper with the boys themselves. After paying a warm tribute to his colleagues on the board, Sir Ernest concluded: "The charm of our work is that it is a life, a real interest, and that you can put yourself into it. It is this that makes us the happy crowd we are and inspires us, notwithstanding the difficulties outside, to go forward upon the same smooth road." (Applause.)

### A Service to National Trade

Mr. Gordon Robbins (deputy-chairman), who seconded the motion, paid a warm tribute to the financial skill with which the Chairman had guided the company's destinies during the year—a year which was the most difficult he could remember in Fleet Street, with the possible exception of 1920–21. He himself attributed three-quarters of their success to the ability of their Chairman in steering them through that very awkward period. He did not think the rank and file could quite appreciate how difficult it was, with companies going down like ninepins and dividends with them, to present the same result as in a year of good trade. A fact that always filled him with faith and pride was the feeling that they were able to render through their trade journals a national service. It was a high thought that so many departments of British trade would be the worse off, and less able to meet the difficulties of the moment, if Bouverie House did not exist. The progressive rise of Benn Brothers was illustrated by the fact that in each year of which he had recollection since he joined the board, each of the fourteen journals was substantially better. The directors had been engaged during the past year in keeping expenses so far as they could in due proportion to revenue. In some cases there had been economies, but the net result had been that no single paper was weaker and each was stronger than a year ago. He particularly wished to emphasise that, because it meant that the business was 5 or 7½ per cent. better than it had been the year before. He also wished to say how much the business owed, on the advertisement side, to Mr. Crole-Rees. He had had the brunt to bear and the accounts were really his reward and showed how much they owed to him in the conduct of this great firm.

Mr. Catchpool expressed the shareholders' congratulations to the directors on the successful year's trading and the resolution was carried unanimously.

Mr. Frank Elliott moved the re-election to the board of Mr. E. G. Benn, Miss F. Robinson and Mr. F. E. Hamer, J.P. This was seconded by Mr. J. A. Knivett and carried unanimously. The provisional agreements relating to the remuneration of directors mentioned by the Chairman in his speech were unanimously approved by the meeting and the auditors were re-elected.

A vote of thanks to the Chairman, moved by Sir Robert Welsford, concluded the proceedings.

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## Flame-Quenching Material in Mines

DICHLORO-DIFLUORO-METHANE has been found practicable for the purpose of extinguishing methane flames, as the result of studies conducted at the Pittsburgh Experiment Station of the United States Bureau of Mines, Department of Commerce. The engineers and chemists at this station are investigating all materials which may be of value in rendering methane, which is the chief combustible gas liberated in mines, less inflammable. It had been found that added substances are of value if such additions narrow the limits of inflammability, raise the ignition temperature, lower the speed of propagation of flame, or reduce the maximum pressure developed. One of these substances, dichloro-difluoro-methane, which is less toxic than carbon dioxide, is a gas at ordinary room temperature and pressure. Tests have been made with this substance to determine the amounts which must be added to extinguish methane flames, and a comparison made with other substances when mixed with methane. The extinctive effect of dichloro-difluoro-methane is almost identical with that of carbon tetrachloride on a volumetric basis, and is superior to that of such gases as carbon dioxide, helium, nitrogen, and argon.

# British Chemical Overseas Trade for July

## Decrease on Last Year's Figures

THE Board of Trade return of British overseas trade for the month of July shows a further decline on the figures for chemicals as compared with July, 1929. Imports totalled £1,099,490, a decline of £261,121, exports £2,260,041, a drop of £258,545, and re-exports £69,420, or £18,552 down. Over the full seven months of this year there are declines of £1,201,813 in imports and £1,188,470 in exports compared with the corresponding period of 1929.

### Imports

| | Quantities Month ended July 31. | | Value Month ended July 31. | |
|---|---|---|---|---|
| | 1929. | 1930. | 1929. | 1930. |
| CHEMICAL MANUFACTURES AND PRODUCTS— | Tons | | £ | £ |
| Acetic Anhydride . cwts. | 2,102 | — | 75,178 | — |
| Acid Acetic.....tons | | 813 | | 32,469 |
| Acid Tartaric .....cwt. | 5,331 | 3,730 | 32,624 | 23,631 |
| Bleaching Materials ,, | 14,408 | 5,285 | 10,885 | 7,757 |
| Borax..... ,, | 17,133 | 17,200 | 12,603 | 9,992 |
| Calcium Carbide .. ,, | 60,071 | 50,300 | 36,540 | 28,868 |
| Coal Tar Products value | — | — | 62,632 | 5,675 |
| Glycerine, crude ..cwt. | 365 | 490 | 706 | 828 |
| Glycerine, Distilled. ,, | 986 | 1,525 | 2,126 | 3,578 |
| Red Lead and Orange Lead.....cwt. | 5,355 | 7,965 | 7,799 | 11,718 |
| Nickel Oxide..... ,, | 219 | — | 1,226 | — |
| Potassium Nitrate (Saltpetre) ..... ,, | 9,535 | 7,176 | 9,514 | 6,951 |
| Other Potassium Compounds.....cwt. | 150,517 | 133,058 | 73,027 | 76,398 |
| Sodium Nitrate ... ,, | 22,626 | 41,220 | 11,622 | 20,583 |
| Other Sodium Compounds.....cwt. | 44,757 | 35,391 | 30,743 | 23,499 |
| Tartar, Cream of .. ,, | 4,260 | 2,372 | 19,118 | 10,759 |
| Zinc Oxide .....tons | 1,054 | 961 | 31,251 | 25,553 |
| All Other Sorts ...value | — | — | 338,518 | 266,014 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts.....oz. | 79,280 | 123,316 | 5,843 | 10,780 |
| Bark Cinchona (Bark Peruvian, etc.) .. cwt. | 1,607 | 3,222 | 6,337 | 14,749 |
| Other Sorts.....value | — | — | 234,803 | 149,321 |
| DYES AND DYESTUFFS— | | | | |
| Intermediate Coal Tar Products.....cwt. | 306 | 91 | 3,199 | 1,032 |
| Alizarine ..... ,, | 136 | — | 4,575 | — |
| Indigo, Synthetic.. ,, | — | — | — | — |
| Other Sorts ..... ,, | 4,155 | 3,773 | 87,663 | 85,961 |
| EXTRACTS FOR DYEING— | | | | |
| Cutch .....cwt. | 2,383 | 1,858 | 4,119 | 3,334 |
| Other Dyeing Extracts cwt. | 4,292 | 2,165 | 15,677 | 6,544 |
| Indigo, Natural ... ,, | — | — | — | — |
| Extracts for Tanning ,, | 52,087 | 86,347 | 55,236 | 83,998 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground .. cwt. | 61,646 | 55,077 | 12,535 | 11,679 |
| White Lead (dry).. ,, | 9,996 | 15,280 | 17,461 | 24,855 |
| All other Sorts .... ,, | 104,995 | 117,997 | 157,051 | 152,964 |
| Total of Chemicals, Drugs, Dyes and Colours.....value | — | — | 1,360,611 | 1,099,490 |

### Exports

| | Quantities Month ended July 31. | | Value Month ended July 31. | |
|---|---|---|---|---|
| | 1929. | 1930. | 1929. | 1930. |
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acid Sulphuric ... cwt. | 20,080 | 13,497 | 6,501 | 4,264 |
| Acid Tartaric ..... ,, | 2,067 | 1,308 | 14,935 | 8,507 |
| Ammonium Chloride (Muriate) .....tons | 255 | 363 | 4,812 | 6,602 |
| Ammonium Sulphate— | | | | |
| To Spain and Canaries tons | 7,643 | 11,921 | 68,156 | 92,560 |
| ,, Italy ..... ,, | 389 | 485 | 3,666 | 4,394 |
| ,, Dutch East Indies tons | 579 | 2,974 | 5,576 | 24,454 |
| ,, China (including Hong Kong) tons | 9,050 | 9,522 | 88,718 | 75,399 |
| ,, Japan ..... ,, | 11,013 | 1,530 | 101,484 | 11,858 |
| ,, British West India Islands and British Guiana tons | 1,973 | 611 | 18,727 | 4,736 |
| ,, Other Countries,, | 9,991 | 10,821 | 90,190 | 79,266 |
| Total ..... ,, | 40,638 | 37,864 | 376,517 | 292,667 |

| | Quantities Month ended July 31. | | Value Month ended July 31. | |
|---|---|---|---|---|
| | 1929. | 1930. | 1929. | 1930. |
| Bleaching Powder.... cwt. | 45,192 | 106,171 | 11,824 | 29,863 |
| COAL TAR PRODUCTS— | | | | |
| Anthracene ..... cwt. | 18 | — | 10 | — |
| Benzol and Toluol.galls. | 229,036 | 14,200 | 17,241 | 1,285 |
| Carbolic Acid ..... cwt. | Cwt. | 2,228 | 22,514 | 5,091 |
| Cresylic Acid..... galls. | 14,531 | 107,589 | | 12,146 |
| Naphtha ..... ,, | 4,565 | 3,055 | 515 | 335 |
| Naphthalene (excluding Naphthalene Oil) cwt. | 6,511 | 3,074 | 2,728 | 1,164 |
| Tar Oil, Creosote Oil, etc. .....galls. | 3,632,304 | 4,089,806 | 98,213 | 100,307 |
| Other Sorts ..... cwt. | 20,473 | 20,099 | 13,542 | 10,890 |
| Total .....value | — | — | 154,763 | 131,218 |
| Copper, Sulphate of..tons | 1,922 | 5,710 | 48,249 | 116,347 |
| Disinfectants, Insecticides, etc. ..... cwt. | 33,114 | 39,106 | 82,518 | 89,175 |
| Gylcerine, Crude .... ,, | 1,046 | 5,744 | 1,449 | 10,292 |
| Glycerine, Distilled... ,, | 8,732 | 17,205 | 22,199 | 39,946 |
| Total ..... ,, | 9,778 | 22,949 | 23,648 | 50,238 |
| POTASSIUM COMPOUNDS— | | | | |
| Chromate and Bichromate..... cwt. | 1,602 | 1,959 | 3,151 | 3,985 |
| Nitrate (Saltpetre) ,, | 1,562 | 1,918 | 2,873 | 3,560 |
| All other compounds ,, | 1,154 | 5,503 | 13,420 | 17,955 |
| Total ..... ,, | 4,318 | 9,380 | 19,444 | 25,500 |
| SODIUM COMPOUNDS— | | | | |
| Carbonate, including Soda Crystals, Soda Ash and Bicarbonate cwt. | 506,170 | 394,031 | 139,800 | 113,461 |
| Caustic..... ,, | 161,679 | 147,126 | 102,045 | 99,509 |
| Chromate and Bichromate ..... ,, | 2,941 | 4,552 | 4,784 | 6,410 |
| Sulphate, including Salt Cake..... cwt. | 279,368 | 80,417 | 34,299 | 10,008 |
| All other compounds ,, | 80,121 | 59,293 | 88,711 | 69,172 |
| Total ..... ,, | 1,030,279 | 685,419 | 369,639 | 298,560 |
| Zinc Oxide .....tons | 101 | 219 | 3,646 | 5,997 |
| Chemical Manufactures, etc., all other Sorts value | — | — | 382,119 | 304,199 |
| Total of Chemical Manufactures and Products (other than Dyes and Dyestuffs) .value | — | — | 1,498,615 | 1,363,137 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts ..... oz. | 218,713 | 124,880 | 21,356 | 14,212 |
| All other Sorts ... value | — | — | 279,625 | 226,906 |
| Total ..... ,, | — | — | 300,981 | 241,118 |
| DYES AND DYESTUFFS— | | | | |
| Products of Coal Tar cwt. | 13,457 | 8,191 | 88,152 | 87,526 |
| Other Sorts ..... ,, | 7,358 | 6,194 | 7,193 | 6,146 |
| Total ..... ,, | 20,815 | 14,385 | 95,345 | 93,672 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground .. cwt. | 3,405 | 525 | 1,787 | 273 |
| White Lead (Dry) . ,, | 4,129 | 2,278 | 8,841 | 4,307 |
| Paints and Colours, in paste form..... cwt. | 39,751 | 32,006 | 80,846 | 63,614 |
| Paints and Enamels Prepared (including Ready Mixed) ..... cwt. | 50,899 | 48,480 | 157,875 | 147,399 |
| All other Sorts .... cwt. | 63,226 | 51,649 | 115,751 | 87,976 |
| Total ..... ,, | 161,410 | 134,938 | 365,100 | 303,569 |
| Total of Chemicals, Drugs, Dyes and Colours.....value | — | — | 2,260,041 | 2,001,496 |

**Re-exports**

| | Quantities Month ended July 31, | | Value Month ended July 31, | |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | 1929. | 1930. | 1929. | 1930. |
| Acid Tartaric..... cwt. | 157 | 128 | 1,208 | 854 |
| Borax..... ,, | 400 | 1,342 | 400 | 893 |
| Coal Tar Products. value | — | — | 1,945 | 16,366 |
| Potassium Nitrate (Saltpetre).....cwt. | 42 | 79 | 69 | 128 |
| Sodium Nitrate. ,, | 596 | 413 | 301 | 206 |
| Tartar, Cream of... ,, | 306 | 400 | 1,468 | 1,820 |
| All other Sorts ... value | — | — | 30,644 | 17,364 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts .....oz. | 31,759 | 11,091 | 3,276 | 1,076 |
| Bark Cinchona, etc. cwt. | 597 | 299 | 2,530 | 2,692 |
| All other Sorts ....value | — | — | 30,231 | 23,917 |
| DYES AND DYESTUFFS— | | | | |
| Cutch ..... cwt. | 1,137 | 151 | 2,076 | 231 |
| All other sorts .... ,, | 166 | 50 | 1,915 | 385 |
| Indigo, Natural ... ,, | 34 | — | 1,137 | — |
| Extracts for Tanning ,, | 2,397 | 892 | 3,001 | 1,231 |
| PAINTERS' COLOURS AND MATERIALS ..... cwt. | 16,994 | 534 | 7,712 | 1,725 |
| Total of Chemicals, Drugs, Dyes and Colours .... cwt. | — | — | 87,972 | 69,420 |

## China Clay Trade

### Exports during July

THE return of quantities and values of China Clay, including Cornish or China stone, the produce of Great Britain and Northern Ireland, exported during July last, is as follows :—

| COUNTRY OF DESTINATION. | QUANTITY. Tons. | VALUE. £ |
|---|---|---|
| Finland ..... | 20 | 60 |
| Latvia ..... | 533 | 869 |
| Sweden..... | 2,686 | 6,043 |
| Norway ..... | 1,275 | 3,442 |
| Germany ..... | 1,333 | 2,647 |
| Netherlands..... | 2,682 | 5,538 |
| Belgium ..... | 4,119 | 8,049 |
| France ..... | 2,723 | 5,561 |
| French Guiana ..... | 108 | 326 |
| Spain ..... | 2,102 | 4,760 |
| Italy ..... | 2,974 | 5,234 |
| Greece ..... | 222 | 523 |
| Turkey, Asiatic..... | 10 | 40 |
| Egypt..... | 1 | 6 |
| China ..... | 6 | 42 |
| United States of America ..... | 6,042 | 13,446 |
| Cuba..... | 1 | 17 |
| Mexico ..... | 35 | 138 |
| Peru ..... | 2 | 10 |
| Chile ..... | 1 | 5 |
| Irish Free State ..... | 6 | 30 |
| Union of South Africa..... | 1 | 5 |
| British India ..... | 656 | 2,886 |
| Bengal, Assam, Bihar and Orissa ..... | 134 | 538 |
| Australia ..... | 3 | 27 |
| New Zealand..... | 1 | 14 |
| Canada..... | 6 | 30 |
| TOTAL..... | 27,682 | 60,291 |

### Industrial Alcohol in Porto Rico

ABOUT one-tenth of the production of molasses in Porto Rico last year was utilised for distilling industrial alcohol and the remainder was shipped to the United States as raw material for the same product. Although enjoying a natural advantage in the manufacture of industrial alcohol, Porto Rican distillers are unable to make full use of it.

During 1929 they sent 1,050,488 gallons of alcohol to the United States, an increase over the 1928 figure of 754,315 gallons. Shipments to the United States represent from 90 to 95 per cent. of the island's production, as very small quantities are utilised locally. All of the 1929 production was the output of one distillery.

## Petroleum Refineries, Ltd.

### Large Plant In Operation

PRESIDING at the first annual meeting of Petroleum Refineries, Ltd., in London on Thursday, August 7, Sir Arthur Hazlerigg said the company now possessed a plant of considerable magnitude ; it was the most up-to-date refinery and the only one of its kind in the country. The delay in its completion was unfortunate, and had lost them the profit on what would have been the summer trade. The board had decided to order as much plant as possible in this country. Those parts of the contract which were placed abroad had been duly executed, but important units had stood idle for months waiting for British manufacturers to deliver what had been ordered in this country. However, the work was at last completed ; the first two converters had been put to work, and the other two should be in operation in about ten days' time.

As to the efficiency and reliability of the plant, during the preliminary period the continuity and ease of running and the quality of the products had been unusually good and beyond their expectations. It was only prudent that they should base all their calculations upon the assumption that they would be getting their supplies of crude oil from the usual sources. They looked forward to the time when they would be able to avail themselves of the supplies of oil which were being produced by their friends, Low Temperature Carbonisation, Ltd., and other companies which produced crude oil from coal. When their plant was in full swing they proposed to develop the refining of coal oil, and so avail themselves of the 4d. rebate in tax to which home produced oils were entitled.

### High Quality Petrol

Colonel W. A. Bristow, M.I.E.E., F.R.Ae.S., said that their refinery was the first of its kind erected in Europe. In Canada and America this new method of making petrol had been extensively taken up, and in Canada, where such plants had been going for two or three years, the financial results were extremely satisfactory. The quality of petrol depended to a large extent upon one of its constituents known as "aromatics," and it was quite usual in this country for the "aromatics" in No. 1 petrol to be somewhere in the neighbourhood of 10 per cent. The "aromatics" contained in "Gyro" petrol, as made in the company's refinery, was approximately 50 per cent., and no other petrol had ever been made in this country, or probably in Europe, with anything like such a high percentage.

Reference had been made recently to the formation of the British Association of Coal-Oil Distillers, and there was a movement on foot in this country to co-ordinate the whole of those distillers, and to put the oil product through a channel whereby its value might be greatly increased, and the obvious channel was the company's works at Killingholme. Plant at Killingholme by cracking the crude coal oil would make available for the English market a very much increased quantity of petrol from coal, and the Government, recognising the importance of fostering this business, were allowing the product to be exempt from the 4d. per gallon duty imposed upon imported supplies. Within the next month there would be carried out at Killingholme the first work on crude coal oil. This would mean that, for the first time in the history of this country—certainly for the first time in the history of the low temperature carbonisation movement—a commercial plant would be in operation converting crude coal oil into petrol and fuel oil.

The supply of coal oil obtained in this country could be indefinitely increased. They could run the British Navy on fuel oil made from coal mined in this country ; they could fly every aeroplane on coal petrol and they could run every gun-tractor, ambulance and motor transport wagon in the army in the same way. Not only would that make a vital difference to the national security, but it would also make a great difference in the annual bill for oil and petrol. At the present time the miners and mine-owners in this country, for every cwt. of oil they brought up from the ground, in the form of coal received about 7d., whereas the consumer was paying about 23s. for a similar quantity of petrol imported from abroad.

# From Week to Week

KREUGER AND TOLL, it is learned, have completed the organisation of the American Turkish Investment Corporation, which is to operate a twenty-five-year match monopoly in Turkey, while guaranteeing a loan of £2,000,000.

A CONFERENCE of agricultural experts to consider how the more technical aspects of agriculture may be approached from an international standpoint, is being arranged by the International Federation of Agricultural Technicians, which is meeting in Rome.

RECENT WILLS include: Eng.-Commander Edgar Riley, of Norton, Durham, and one of the chief officials of Imperial Chemical Industries Factory, Billingham (net personalty, £1,773) £2,195. Mr. Thomas Walter Venables, of Leicester, founder of T. Venables and Co., ink, stain and dressing specialists (net personalty, £11,617), £14,696.

THE ALEXANDER PEDLER LECTURE in connection with the British Science Guild will be given by Lt.-Col. Sir David Prain, in Liverpool, on Wednesday, October 22, and will be entitled "Science Discipline." Sir William Pope will deliver the sixth annual Norman Lockyer lecture on Thursday, November 13, in the Goldsmiths' Hall, London.

MUREX, LTD., who specialise in the treatment of complex ores and the manufacture of various carbon-free metals, have just purchased practically the whole of the issued shares of Alloy Welding Processes, Ltd. They already own all the share capital of the Premier Electric Welding Co., Ltd., whose works will be removed shortly to the new factory of Alloy Processes acquired only eighteen months ago.

THE MARKET for disinfectants, insecticides and animal dressings in Turkey is the subject of a confidential report prepared by the Department of Overseas Trade from information furnished by the Commercial Secretary at Istambul. Firms desirous of receiving a copy should communicate with the Department quoting Ref. No. B.X. 6,662. A similar report has also been prepared on the market for disinfectants, insecticides and similar substances in Bolivia (Ref. No. B.X. 6673).

"THE TIMBER OF CORSICAN PINE" is the title of the Forest Products Research Bulletin No. 6, issued by the Department of Scientific and Industrial Research (H.M. Stationery Office, 2s. 6d. net) and covering a series of tests which have been carried out on this timber at the research laboratory at Princes Risborough. In its arrangement, the Bulletin first describes the structure of the wood, and then gives an account of the tests and the conclusions drawn from them, which cover seasoning, mechanical properties, and susceptibility to impregnation with preservatives.

A NEW COMPANY, to be known as Goodlass, Wall and Lead Products, Ltd., as was announced on Thursday, is to be formed to absorb the business of Associated Lead Manufacturers, Ltd., and of Goodlass, Wall and Co., Ltd., paint, colour and varnish manufacturers, of Liverpool. The nominal capital of the new concern will be £3,250,000. "The united manufacturing and selling organisation thus created," write the directors of Associated Lead Manufacturers, "will be one of great strength, and the added facilities for distribution and the interchange of technical information thus made possible will enable the combined businesses to be carried on both at home and abroad on the most up-to-date and economical lines."

SEVERAL AUSTRALIAN DRUG FIRMS have formed a holding company with a nominal capital of £5,000,000, known as Drug Houses of Australia, Ltd. Each company will be carried on in the same name and under the same direction as before, subject only to the general direction of the holding company as to policy and uniform methods. The companies in the merger are A. M. Bickford and Sons, Adelaide and Brisbane; Duerdin and Sainsbury, Melbourne; Elliott Bros., Sydney; Elliott Bros. (Victoria) Pty., Melbourne; Felton, Grimwade and Co., Melbourne; Felton, Grimwade Dental Co., Melbourne; Felton, Grimwade Export Pty., Sydney; Felton, Grimwade, and Bickford, Perth, Fremantle, and Kalgoorlie; Taylor and Colledge (Sydney), Brisbane and Sydney; Taylors and Elliots, Brisbane and Townsville; T. and E. (Surgical), Brisbane. The Australian Drug Co., Sydney, will also be a member of the new company if its shareholders confirm negotiations.

INDUSTRIAL MERGERS in the United States between the years 1919–28 totalled 4,135, of which 193 concerned chemical undertakings.

IMPORTATIONS into Jamaica of chemical manures for the calendar year of 1929 reached 2,719 long tons. The United States supplied 1,513 tons, United Kingdom 729, Germany 288 and Norway 147 tons.

GERMAN RAYON YARN EXPORTS during the first half of the present year have fallen to 3,591,000 kilos, as compared with 4,302,600 kilos in the first half of 1929. Exports to the U.S.A. alone dropped from 1,303,000 kilos in 1929 to 675,000 kilos this year.

NEGOTIATIONS have been completed for the purchase of the house and estate of Craigiebuckler, on the boundaries of Aberdeen, by Mr. T. B. Macaulay, president of the Sun Life Assurance Company of Canada, as the site for the establishment of the Macaulay Institute for Soils Research.

METROPOLITAN-VICKERS ELECTRICAL CO., LTD., have just opened a new lamp depot at 53, Aire Street, Leeds, for the sale of their "Cosmos" Lamps in the Leeds district. The general engineering business, however, will continue to be dealt with from their Leeds office at Permanent House, The Headrow, Leeds.

NEGOTIATIONS have been concluded between the Russian Naphtha Syndicate and the Turkish Government concerning the prolongation of the oil delivery agreement. The new agreement, which comes into force in October, leaves delivery conditions unchanged, whilst the amount of Russian oil to be imported into Turkey has been slightly reduced.

AT THE CONVENTION of the French Turpentine Producers' Association of the Southwest, considerable time was devoted to discussing the question of fraud in the marketing of turpentine. The alleged frauds, which concerned producers, manufacturers and consumers of turpentine, were of several sorts, all detracting from the purity of turpentine, such as adding decamphorated oil to the pure turpentine or replacing it by mineral substitutes.

THE INTERNATIONAL ELECTROLYTIC PLANT CO., City Electricity Works, New Crane Street, Chester, announce that, owing to the increased demand for Knowles cells, they have taken over the works formerly occupied by the Sandycroft Foundry Co., Ltd., at Sandycroft, near Chester, and covering 13 acres. A quantity of new plant is being installed and it is anticipated that the transfer to the new premises will be completed in about two months' time.

AN INQUEST was opened on Friday, August 8, at Huddersfield, on Lawrence Schofield (23), a workman employed by the British Dyestuffs Corporation, Ltd., who died from uræmia, following upon chronic nephritis. A doctor stated that uræmia could be caused by mercurial or lead poisoning, but he could find no evidence that it had been in this case. The inquest was adjourned until Thursday, August 21, the coroner remarking that it was desirable to get to know more about the conditions in which the man was employed.

THE STATE MINES at Jachymov (Joachimstal) during 1929, produced 33,519 kilograms of uranium ore, and for the first five months of the current year 7,849 kilograms. The production of uranium dyes was 23,347 and 8,582 kilograms respectively. From the radioactive residues of the ore there was last year extracted 3,521·4 milligrams of radium. Since 1918 the management of the State Mines has disposed of some 8 grammes of radium secured from Jachymov. The present price of radium is about 57 dollars per milligram. Czechoslovak radium has so far been sold to England, Austria, Germany, Yugoslavia and other Balkan countries and to Japan.

THE SAFETY IN MINES RESEARCH BOARD has just published its Annual Report for 1929 (H.M. Stationery Office, 1s. net), which is devoted mainly to brief accounts of the progress of the numerous researches which are being carried out directly under the Board or by Committees of the Board, or at Universities and other centres with the aid of funds supplied by the Board. The subjects of research include problems relating to coal dust explosions, firedamp explosions, spontaneous combustion of coal (including the treatment of gob-fires), the safe use of electricity in coal mines, mining explosives, safety lamps, falls of ground, wire ropes, the control of mine temperatures and mine ventilation.

# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

## Abstracts of Accepted Specifications

330,498. Destructive Hydrogenation. W. R. Tate and H. P. Stephenson, Norton Hall, The Green, Norton-on-Tees, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, December 8, 1928.

Prior to destructive hydrogenation, carbonaceous materials are preheated in two or more stages at successively higher pressures. The earlier stage or stages may be effected in absence of hydrogen without appreciable decomposition of the material. The later stages may be effected in presence of hydrogen, the final stage being at the pressure of the reaction. Various examples are given. The final stage of preheating may be performed in the reaction vessel itself by means of superheated hydrogen.

330,511. Acyl Halides. G. B. Ellis, London. From Soc. des Usines Chimiques Rhône-Poulenc, 21, Rue Jean-Goujon, Paris. Application date, March 1, 1929.

α-Halogen- or α : β-dihalogen-ethyl esters are dissociated with production of acyl halides by passing the vapours through heated tubes. Catalysts such as pumice, refractory earths, kieselguhr, activated charcoal, or silica gel may be present, and may carry activating agents such as sulphuric acid, phosphoric acid, bisulphates, acid phosphates, zinc or cadmium halides, or the acid catalysts referred to in Specification 329,721. (See The Chemical Age, Vol. XXIII, p. 87.) In examples (1) α-chlorethyl acetate vapour is passed over pumice at 250–300° C. to obtain acetyl chloride, (2) α : β-dichlorethyl acetate vapour is passed over pumice at 250° C., (3) α-chlorethyl acetate vapour is passed through a tube heated to 360–380° C.

330,519. Synthetic Drugs. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 6, 1929.

Aliphatic homologues of polyhydroxybenzenes in which at least eight carbon atoms are present in the alkyl side chain are converted by known methods into their metallic salts or into salt-like compounds with bases. The products have therapeutic value. The reaction may be, for example, a double decomposition between a metal salt of the phenol and a salt of the base. Examples are given of the reactions of (1) octylresorcinol, decylresorcinol, dodecylresorcinol, decylpyrocatechol, and decylpyrogallol with hexamethylenetetramine, (2) decylresorcinol with piperazine, sarcosine anhydride, and betaine, (3) sodium decylresorcinolate with calcium chloride. The decylpyrocatechol and decylpyrogallol used are obtained by reducing the *n*-decylyl derivatives of pyrocatechol and pyrogallol which result from treatment of the phenols with capric acid and zinc chloride.

330,520. Indiarubber. Soc. Italiana Pirelli and U. Pestalozza, 21, Via Fabio Filzo, Milan, Italy. Application date, March 6, 1929. Addition to 284,608 (see The Chemical Age, Vol. XVIII, p. 326).

Aromatic disubstituted guanidines, *e.g.*, sym.-diphenylguanidine, phenyl-*o*-tolylguanidine, and di-*o*-tolyguanidine, are used for coagulating latex according to the process of the parent specification in which latex containing small quantities of coagulant is subjected to local heating. Vulcanizing ingredients may also be present and either crude or concentrated latex may be treated.

330,537. Acetic Anhydride. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 8, 1929.

To obtain acetic anhydride acetic acid vapour is passed over a catalyst comprising boron phosphate and a phosphate or other compound of an alkali metal at 400–700° C. The catalyst is regenerated when a deposit of carbon appears by igniting it in air. To prepare the catalyst boron phosphate may be added to a solution of alkali phosphate, borate, carbonate, or hydroxide, the whole being then evaporated to dryness and calcined. Specified catalysts are prepared from (1) boron phosphate and either acid sodium ammonium phosphate, borax, or sodium hydroxide, (2) boron phosphate, lithium metaphosphate, and sodium metaphosphate.

330,548. Disinfectants and Fungicides. Sir G. C. Marks, London. From E.I. Du Pont de Nemours and Co., Wilmington, Delaware, U.S.A. Application date, November 29, 1928.

Organo-mercury compounds of the general formula (R—Hg)y—X, in which R is unsubstituted alkyl or aryl, X is an acid radicle, and y is 1 or 2, are used for disinfecting seed-grain. They are applied either in the form of fine powder or mixed with a solid diluent, the mercury compound comprising 1–10 per cent. of the mixture. Sulphur-containing compounds, *e.g.*, sodium thiosulphate or potassium thiocyanate which inhibit or allay injurious action of the compounds on the seeds, may be added. Suitable compounds are ethyl mercury chloride or the corresponding sulphate, thiosulphate, thiocyanate, acetate, cyanide, sulphide, hydroxide, or xanthate, phenyl mercury. chloride, sulphur compounds of the type $(R—Hg)_2S$, and of the type $R—Hg_2S—R_1$. Alkyl mercury thiocyanates are obtainable by (1) interaction of alkyl mercury acetates with potassium thiocyanate, or (2) heating the mercury bis compounds with mercuric thiocyanate, and alkyl mercury thiosulphates and xanthates are obtainable by reaction between alkyl mercury acetates and potassium thiosulphates or xanthate in water or alcohol.

330,579. Dyes and Dyeing. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 11, 1929. Addition to 324,119 (see The Chemical Age, Vol. XXII, p. 273).

Water soluble derivatives of leuco compounds of vat dyes are obtained by treating the leuco compounds with a benzoic acid sulphohalide in presence of a tertiary base. The products, which are probably carboxylic esters containing free sulphonic groups, are saponifiable both by acids and by alkalies, yielding in the latter case vats which may be used directly for dyeing. The treatment of the leuco compounds of thioindigo, *N*-dihydro 1 : 2 : $2^1$ : $1^1$-anthraquinoneazine, and Caledon jade green with benzoic acid *m*-sulphochloride in presence of pyridine is described. The use of the *p*-sulphochloride and of the *m*- and *p*-sulphobromides of benzoic acid is also specified.

330,583. Synthetic Drugs. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, January 10, 1929.

Therapeutically valuable substituted ureas and thioureas are obtained by interaction of phosgene or a polymer thereof, thiophosgene, or carbon disulphide with an aromatic amine substituted in the amino group, either directly or through an aminoaroyl linkage, by one or more heterocyclic residues containing an unsubstituted amino group, or by one substituted by an aminoaroyl group, such as a benzoyl or benzenesulphonyl group. The heterocyclic compounds used as starting materials are such as contain a nitro group and one or more replaceable halogen atoms. Specified polymers of phosgene are diphosgene, $CCl_3.O.CO.Cl$, and triphosgene, $C.Cl_3.O.CO.O.C.Cl_3$, and specified heterocyclic residues are derived from acridine, 1 : 3-quinazoline, aryltriazines, and arylpyrimidines.

330,591. Dyes and Dyeing. British Celanese, Ltd., 22, Hanover Square, London, and H. C. Olpin, Spondon, Derby. Application date, March 12, 1929.

Cellulose ester or ether materials are coloured by the application in substance of azo dyes containing the ar-tetrahydronaphthalene nucleus or by forming such dyes upon the materials. The dyes are of the type, ar-tetrahydro-α-or β-naphthylamine→suitable components, or of the type, suitable diazo components→ar-tetrahydro-α-or β-naphthylamine or derivatives thereof.

330,602. Dyes and Dyeing. British Celanese, Ltd., 22, Hanover Square, London, and H. C. Olpin, Spondon, Derby. Application date, March 12, 1929.

*N*-nitroaryl-ar-tetrahydro-α- or β- naphthylamines, which are applicable for dyeing cellulose ester or ether materials, are made by condensing ar-tetrahydro-α- or β-naphthylamine or derivtatives thereof with nitrated aromatic compounds containing one or more labile halogen atoms, such as 2-

nitrochlorbenzene, 2 : 4-dinitrochlorbenzene, 2-nitrobrombenzene, 2 : 5-dichlornitrobenzene, 2 :4-dinitrochlorbenzene-6-sulphonic (or 6-carboxylic) acid.

330,607. DYES AND DYEING. Imperial Chemical Industries, Ltd., Millbank, London, and R. Brightman, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, March 13, 1929.

Trisazo dyes which contain at least two sulphonic groups or two carboxylic groups or one of each, and are suitable for dyeing viscose and like regenerated cellulose materials in level shades, are obtained by tetrazotising 3 : $4^1$-diaminoazobenzene or a substitution product thereof, provided that the substituent is not an amino or substituted amino group, and coupling with two molecular proportions of the same or different coupling components other than naphtholarylketones or arylides of 2 : 3-oxynaphthoic acid. Some of the products are obtainable by an alternative method, viz., by diazotising 3- nitro-$4^1$-aminoazobenzene or a suitable derivative thereof, coupling with a sulphonic or carboxylic derivative of a phenol, a naphthol, or an *N*-substituted naphthylamine or aminonaphthol, reducing the $NO_2$ group, diazotising the resulting $NH_2$ group, and coupling with a suitable component. The 3 : $4^1$ diaminoazobenzene and its substitution products are obtainable by coupling diazotised *m*-nitraniline or derivatives thereof with amines of the benzene series, coupling in *p*-position to the amino group, and thereafter reducing the nitro group. Several examples are given.

330,623. OLEFINES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 11, 1929.

Relates to the production of olefines by thermal decomposition, if desired in presence of metal oxide catalysts, of saturated hydrocarbons higher than ethane in the gaseous phase. To suppress the formation of methane and increase the yield of olefines, from one to nine proportions by volume of methane are added to the starting materials. The latter may be propane or its homologues, or mixtures thereof, or mixtures containing saturated hydrocarbons such as mineral oils, brown coal tars, and the products derived therefrom by destructive hydrogenation, distillation, or cracking. Oxides of zinc, magnesium, calcium, uranium, or silver are suitable catalysts. In examples ethylene, propylene, and isobutylene are obtained by passing mixtures of propane, isobutane, methane, and nitrogen at 650° C., through tubes of quartz or V2A steel containing pumice stone and zinc oxide.

330,643. DYE INTERMEDIATES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 16, 1929.

Hydroxycarboxylic acids of naphthocarbazoles are obtained by a process comprising the steps of (1) heating naphthylaminesulphonic acids with phenylhydrazine in presence of sodium bisulphite and treating the resulting bisulphite compounds with hydrochloric acid to obtain the corresponding naphthocarbazole-sulphonic acids, (2) fusing the latter with caustic alkali to obtain the hydroxynaphtho-carbazoles, (3) causing carbon dioxide to act on alkali compounds of the hydroxynaphtho-carbazoles or on the hydroxynaphthocarbazoles in presence of an alkali hydroxide or carbonate. In examples are described the preparations of carboxylic acids of 5-hydroxy-1 : 2-naphthocarbazole, 5-hydroxy-2 : 1-naphthocarbazole, 6-hydroxy-2 : 9-naphthocarbazole, and 7- hydroxy-2 : 1-naphthocarbazole.

330,644. ANTHRAQUINONE DERIVATIVES. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 16, 1929.

1 : 4-Diaminoanthraquinone and its nuclear substitution products are converted into diaminoazoanthraquinones by subjecting them to oxidation in solution or suspension in an organic acid. Thus 4 : $4^1$—diamino—1 : $1^1$—azoanthraquinone is obtained by oxidising 1 : 4-diamino-anthraquinone in glacial acetic acid by means of chromic acid. Other specified starting materials are the 2-chloro-, 2-bromo-, and 5-nitro- derivatives of 1 : 4-diamino-anthraquinone, other organic acids are monochloracetic and propionic acids, and other oxidising agents are manganese dioxide and lead peroxide.

330,650. MAGNESIUM CHLORIDE. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 15, 1929.

Addition of ammonia, preferably in the form of gas, to aqueous solutions of magnesium chloride containing ammonium chloride causes precipitation of the compound $MgCl_2$, $6NH_3$. More effective precipitation may be ensured by cooling to —30° C. The precipitate is separated and heated to about 500° C. to obtain anhydrous magnesium chloride.

330,661. ALUMINA. W. J. Müller and H. Hiller, 13, Karlplatz, Vienna. Application date, March 19, 1929.

Bauxite is treated at temperatures above 190° C., and at a pressure corresponding to the vapour pressure at this temperature, with aluminate lye of 20—22° Bé. The mixture may be kept in continuous progressive movement through the autoclave by a high pressure pump and delivered from the reaction chamber through a loaded valve or through a counter pressure pump. The red slime is separated from the mixture and the aluminium hydrate is caused to separate in known manner. No concentration of the aluminate lye is required at any stage other than the concentration by evaporation of the wash liquors to 22° Bé.

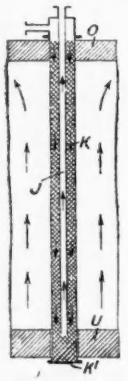
330,777. CALCIUM ACID PHOSPHATE. R. Haddan, London. From Federal Phosphorus Co., Anniston, Alabama, U.S.A. Application date, June 20, 1929.

Milk of lime is added to concentrated phosphoric acid with agitation, and the suspension of calcium acid phosphate so formed is sprayed into warm air. The dried product obtained is composed of spheroidal particles substantially free from sticky or gummy substances, and contains less than 1 per cent. of free phosphoric acid. It is applicable as an acid ingredient of baking powder and like mixtures.

330,862. SYNTHETIC DRUGS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, October 25, 1928. Addition to 296,327. (See THE CHEMICAL AGE, Vol. XIX, p. 322.)

3:$3^1$-Dichloro-4 : $4^1$-dihydroxy-5 : $5^1$-diacetylaminoarsenobenzene is obtained by acetylation of the diamino compound. The latter is prepared by reduction of 3-chloro-4-hydroxy-5-nitrophenylarsinic acid.

330,872. CATALYTIC APPARATUS. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, December 15, 1928.



330,872

Endothermic catalytic gas reactions are effected in a reaction tube K, which is fixed at one end only to the wall O of the surrounding heating chamber, and is provided with an inner tube J extending to the bottom of the tube K for the removal of the reaction products. The free end of the tube K may extend through the wall U of the heating chamber and be fitted with a removable closure $K^1$.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention: 307,798 (Knoll Akt.-Ges. Chemische Fabriken and K. F. Schmidt), relating to production of amines from organic acids and their anhydrides, see Vol. XX, p. 479; 309,610 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of water-soluble derivatives of aromatic diazo compounds, see Vol. XX, p. 595; 309,911 (Soc. Anon. M. Naef et Cie.), relating to production of cyclohexene aldehydes and cyclohexene carboxylic acids, which contain at least one dialkylated ring carbon atom, see Vol. XX, p. 595; 313,919 (I.G. Farbenindustrie Akt.-Ges.), relating to manufacture of rubber derivatives, see Vol. XXI, p. 178; 314,944 (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij), relating to manufacturing nickel in a finely-divided state, in particular for the catalytic manufacture of hydrogen from a mixture of methane and water vapour, see Vol. XXI, p. 224.

### Specifications Accepted with Date of Application

306,512. Oxygenated organic compounds, Manufacture of. Soc. l'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. February 22, 1928.

308,740. Isatins, Manufacture of. I.G. Farbenindustrie Akt.-Ges. March 27, 1928.

310,055. Cyclic ketones, Manufacture of. Schering-Kahlbaum Akt.-Ges. April 21, 1928.

310,425. Recovery of copper from spent copper lyes, Process for. I.G. Farbenindustrie Akt.-Ges. April 25, 1928.

313,487. Welding-agent for magnesium alloys. I.G. Farbenindustrie Akt.-Ges. June 12, 1928.
313,489. Removing gases from molten light metals, such as aluminium and its alloys, Method of. June 12, 1928.
317,035. Rhenium, Process for obtaining. Siemens und Halske Akt.-Ges. August 9, 1928.
332,532. Gaseous exothermal catalyses. O. Piette and Union Chimique Belge Soc. Anon. April 12, 1929.
332,533. Preparation of emulsions, suspensions, and colloidal dispersions, Process and apparatus for. P. Freedman. April 15, 1929.
332,557. Colloidal solutions and pastes, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*) April 22, 1929.
332,560. Dyestuffs of the triphenylmethane series, Manufacture of. A. Carpmael (*I.G. Farbenindustrie Akt.-Ges.*) April 22, 1929.
332,571. Hydrogen, Production of. C. F. R. Harrison and Imperial Chemical Industries, Ltd. April 19, 1929.
332,579. Vat dyestuffs of the dibenzopyrenequinone series, Manufacture of. I.G. Farbenindustrie Akt.-Ges. March 23, 1929. Addition to 308,617.
332,584. Metal carbamates, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). March 20, 1929.
332,605. Vinyl ethers, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). March 22, 1929.
332,623. Condensation products containing nitrogen, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). February 22, 1929.
332,627. Rhenium concentrations, Extraction of. Siemens und Halske Akt.-Ges. November 22, 1928.
332,630. Diazo solutions, Production of. O. Y. Imray (*I.G. Farbenindustrie Akt.-Ges.*). March 27, 1929.
332,634. Condensation products from a urea and formaldehyde, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). April 19, 1929.
332,635. Acetaldehyde, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). April 22, 1929.
332,639. Concentrated fertiliser material, Process of making. W. W. Triggs (*Armour Fertilizer Works*). April 25, 1929.
332,731. Acetylene, Production of. R. M. Winter, P. H. Hull, J. Ferguson, and Imperial Chemical Industries, Ltd. July 12, 1929.
332,750. Chemical fertiliser, Production of. A. Holz and T. van D. Berdell. July 30, 1929.
332,756. Ethers, Manufacture of. H. D. Elkington (*Naamlooze Venootschap De Bataafsche Petroleum Maatschappij*). August 1, 1929.
332,762. Conversion products of rubber, Manufacture and production of. J. Y. Johnson (*I.G. Farbenindustrie Akt.-Ges.*). August 6, 1929.
332,764. Preventing oxidation or retarding ageing of organic compounds, Process for. Goodyear Tyre and Rubber Co. November 26, 1928.
332,803. Simultaneous preparation of fertilisers containing magnesium phosphate and of nitrogen fertilisers, Process for. F. Uhde. October 25, 1928.
332,840. Stable supersaturated calcium gluconate solutions, Manufacture of. Chemische Fabrik vorm. Sandoz. October 29, 1928.
332,864. Chemical fertilisers. Soc. Chimique de la Grande Paroisse Azote et Produits Chimiques. November 23, 1928.
332,868. Amines, Manufacture of. I.G. Farbenindustrie Akt.-Ges. November 27, 1928.

## Applications for Patents

***[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]***

Carpmael, A. (I.G. Farbenindustrie Akt.-Ges.). Manufacture of polymerised styrols. 23,600. August 6.
—— Vulcanisation of rubber, etc., masses. 23,902, 23,903, 23,904. August 9.
Chemische Fabrik vorm. Sandoz. Manufacture of wetting-out preparations, etc. 23,562. August 6. (Germany, June 14.)
Collins, C. H. R. Moulding and curing rubber goods. 23,519. August 6.
Deutsche Hydrierwerke Akt.-Ges. Production of saturated alcohols of high molecular weight. 23,484. August 5. (Germany, August 3, 1929.)
Distillers Co., Ltd. Manufacture of alcohol and ether. 23,907. August 9.
Dreyfus, H. Production of textile, etc., materials made of or containing cellulose. 23,709. August 7. (May 31, 1929.)
Fairweather, D. A. W. Dyeing, etc. 23,477. August 5. (July 22.)
Fränkl, M. Separation of carbonic acid, etc., vapours from gases. 23,671. August 7. (Germany, August 19, 1929.)
Fraser, J. P. Means for making hard transparent soap. 23,397. August 5.
Gas Machinery Co. Apparatus for manufacturing water-gas. 23,856. August 8.
Ges. für Linde's Eismaschinen Akt.-Ges. Decomposition of coking-gases, etc. 23,849. August 8. (Germany, August 9, 1929.)
Groves, W. W. (I.G. Farbenindustrie Akt.-Ges.). Manufacture of lacquers, etc. 23,696. August 7.
Heckel, H. Inks, etc. 23,859. August 8.
—— Emulsified ink and paints. 23,860. August 8.
Henshaw, D. M. Apparatus for bringing gases, etc., into intimate contact with liquids. 23,662. August 7.
I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of acetylene. 23,436. August 5.
—— Dyeing cellulose esters, etc. 23,554. August 6.
—— Production of dyeings on cellulose esters, etc. 23,555. August 6.
—— Manufacture of adhesives, etc. 23,681. August 7.
—— Apparatus for introducing, etc., solids into high-pressure vessels. 23,682. August 7.
—— Manufacture of coloured pictures. 23,683. August 7.
—— Manufacture of lacquers, etc. 23,696. August 7.
—— Washing compositions and processes. 23,805. August 8. (March 21.)
—— Apparatus for separation of gases, etc., in liquid form. 23,806. August 8.
—— Manufacture of wetting, etc., agents. 23,807. August 8.
—— Manufacture of subsoil and submarine cables, etc. 23,895. August 9.
I.G. Farbenindustrie Akt. Ges. Manufacture of condensation products from diolefines, etc. 23,905. August 9. (July 5, 1929.)
—— Increasing resistance to corrosion of objects made from alloys of magnesium with manganese. 23,428. August 5. (Germany, August 23, 1929.)
—— Manufacture of polymerization products from oils, etc. 23,553. August 6. (Germany, August 10, 1929.)
—— Photographic printing. 23,588. August 6. (Germany, August 6, 1929.)
—— Manufacture of polycyclic compounds. 23,697. August 7. (Germany, August 8, 1929.)
—— Manufacture of basic products. 23,820. August 8. (August 7, 1929.)
—— Smelting pulverulent oxide iron ores. 23,863. August 8, (Germany, August 10, 1929.)
Imperial Chemical Industries, Ltd. Production of polymerised derivatives. 23,546. August 6. (United States, August 6, 1929.)
International Industrial and Chemical Co., Ltd. Manufacture of barium oxides. 23,833. August 8.
Joshua, W. P. Manufacture of alcohol and ether. 23,907. August 9.
Kodak, Ltd. Manufacture of mixed esters of cellulose. 23,441, 23,442. August 5. (United States, August 2, 1929.)
—— Dehydrating alcohol. 23,819. August 8. (United States, August 29, 1929.)
Lainau, A. Preparation of ammonium sulphate and nitrogen. 23,853. August 8. (Germany, August 21, 1929.)
Manesse, G. C. A. and Séchehoye, J. Preparation of condensation products from urea and formaldehyde. 23,556. August 6. (France, August 7, 1929.)
Negishi, S. Manufacture of paint. 23,727. August 7.
—— Manufacture of lead oxides. 23,728. August 7.
—— Manufacture of lead sulphates containing lead oxide. 23,729. August 7.
Nicolardot, P. L. F. Hydrogenation and desulphuration of hydrocarbon mixtures. 23,530. August 6. (France, August 14, 1929.)
Ramsay, D. M. Distillation of carbonaceous substances. 23,509. August 6.
Robson, S. Manufacture of sulphuric acid. 23,848. August 8.
Schoenfeld, M. Treating thread coils, etc. of artificial silk. 23,669. August 7. (Germany, August 9, 1929.)
Standard Oil Development Co. Viscous hydro carbons for use as lubricants, etc. 23,916. (United States, October 5, 1929.)
Steatite and Porcelain Products, Ltd. Manufacture of electric insulators. 23,466. August 5.
Triggs, W. W. (Du Pont de Nemours and Co.). Propellant powders. 23,918. August 9.
—— (Elektriska Svetsnings Aktiebolaget). Separating substances off gaseous or liquid medium. 23,663. August 7.
—— (Metal Finishing Research Corporation). Coating metal with organic salt of the metal. 23,837. August 8.
—— (Ohio Brass Co.). Electric cable joints. 23,836. August 8.
Vorländer, D. Preparation of ammonium sulphate and nitrogen. 23,853. August 8. (Germany, August 21, 1929.)
Wade, H. (Lux). Manufacture of refractory ceramic ware. 23,914. August 9.

# Weekly Prices of British Chemical Products

*The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.*

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID, CHROMIC.—1s. 0½d. per lb. d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot £20 to £25 per ton, makers' works according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9½d. and 10d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3½d. per lb. Liquor, £18 10s. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4⅛d. per lb. nett d/d U.K., discount according to quantity; ground ¼d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2 cwt. bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS.—3½d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3½d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—6d. to 7½d. per lb. Crude 60's 1s. 11d. to 2s. 1d. per gall. August/December.

ACID CRESYLIC 99/100.—2s. 2d. to 2s. 4d. per gall. B.P., 5s. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Refined, 2s. 7d. to 2s. 10d. per gall. Pale, 95%, 1s. 9d. to 1s. 10d. per gall. 98%, 1s. 11d. to 2s. Dark, 1s. 6½d. to 1s. 7½d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED, 1080/1090.—4½d. to 5½d. per gall. 1100, 5½d. to 6d. per gall.; 1110, 6d. to 6½d. per gall. Unstrained (Prices only nominal).

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall.; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 9d. to 1s. 11d. per gall. Pure, 1s. 11d. to 2s. 2d. per gall.

XYLOL.—1s. 5d. to 1s. 10d. per gall. Pure, 1s. 8d. to 2s. 1d. per gall.

CREOSOTE.—Cresylic, 20/24%, 6¾d. to 7d. per gall.; Heavy, for Export, 6¼d. to 6¾d. per gall. Home, 4d. per gall. d/d. Middle oil, 4¾d. to 5d. per gall. Standard specification, 3d. to 4d. per gall. Light gravity, 1¼d. to 1½d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 8¾d. per gall. Solvent, 90/160, 1s. 3d. to 1s. 3½d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 6d. per gall. Solvent 90/190, 1s. to 1s. 2½d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £3 to £4 per ton. Whizzed, £4 10s. to £5 per ton. Hot pressed, £8 per ton.

NAPHTHALENE.—Crystals, £10 per ton. Purified Crystals, £14 10s. per ton. Flaked, £11 per ton.

PITCH.—Medium soft, 46s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 9d. to 4s. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. 3d. per gall. Heavy prices only nominal.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8¼d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8¼d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

*o*-CRESOL 30/31° C.—£3 1s. 10d. per cwt., in 1 ton lots.

*m*-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

*p*-CRESOL 34·5° C.—1s. 9½d. per lb., in ton lots.

DICHLORANILINE.—1s. 10d. per lb. f.o.r. works.

DIMETHYLANILINE.—Spot, 1s. 8d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—8d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7½d. per lb.; 66/68° C., 9d. per lb f.o.r. works.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

*a*-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

*B*-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

*a*-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

*B*-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

*o*-NITRANILINE.—5s. 11d. per lb.

*m*-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

*p*-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb, 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

*o*-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

*p*-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

*m*-XYLIDINE ACETATE.—3s. 1d. per lb. ex works.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton

BROWN SUGAR OF LEAD.—£38 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—4s. 10½d. to 5s. 3d. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—3½d. to 4 1/16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.
DIPHENYLGUANIDINE.—2s. 9d. per lb.
LITHOPONE, 30%.—£20 to £22 per ton.
SULPHUR.—£9 10s. to £13 per ton, according to quality.
SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.
SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.
ZINC SULPHIDE.—8d. to 11d. per lb.

## Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£37 per ton, ex wharf London, barrels free.
ACID, ACETYL SALICYLIC.—2s. 9d. to 2s. 11d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 6d. to 1s. 6¾d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 1d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 9d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½ cwt. lots. Packages extra. Special prices for quantities and contracts.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb.
BISMUTH CARBONATE.—6s. 6d. per lb.
BISMUTH CITRATE.—6s. 9d. per lb.
BISMUTH SALICYLATE.—6s. 7d. per lb.
BISMUTH SUBNITRATE.—5s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 4s. 4d. per lb.
BISMUTH OXIDE.—8s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. per lb.
BISMUTH SUBGALLATE.—6s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; For one ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 5½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 8d. per lb. Prices for 1 cwt. lots.
CALCIUM LACTATE.—B.P., 1s. 1½d. to 1s. 3d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 3s. to 3s. 2d. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 1d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 5d. per lb.; potassium, 2s. 8½d. per lb.; sodium, 2s. 7½d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 5d. per lb. for 28 lb. lots. Green, 3s. 1d. per lb., list price. U.S.P., 2s. 4d. to 2s. 7d. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8½d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 17s. per lb. net; Synthetic, 9s. 6d. to 11s. per lb.; Synthetic detached crystals, 9s. 6d. to 11s. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d. per lb
METHYL SULPHONAL.—18s. 6d. to 20s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENAZONE.—5s. 6d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—89s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 3d. per lb. in 28 lb. lots. Smaller quantities 1d. per lb. more.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125 lb. kegs
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—43s. 6d. per lb.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE, B.P.C., 1911, AND U.S.P. VIII.—1s. 11d. per lb., B.P.C. 1923, and U.S.P. IX—2s. 3d. per lb. Prices for 28 lb. lots. Smaller quantities 1d. per lb. more.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. net. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—9s. 6d. to 10s. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 8s. 3½d. to 9s. 2d. per lb., according to quantity. Natural, 12s. per lb.

## Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—12s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—5s. per lb.
AMYL CINNAMIC ALDEHYDE.—10s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—7s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZYL BENZOATE.—2s. 6d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—11s. per lb.
CITRONELLOL.—8s. per lb.
CITRAL.—8s. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—9s. 3d. per lb.
GERANIOL (PALMAROSA).—17s. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—11s. 6d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—46s. per lb.
SAFROL.—2s. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN, EX CLOVE OIL.—13s. to 15s. per lb. Ex Guaiacol, 12s. 6d. to 13s. 9d. per lb.

## Essential Oils

ALMOND OIL.—Foreign S.P.A., 10s. per lb.
ANISE OIL.—4s. 9d. per lb.
BERGAMOT OIL.—10s. per lb
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR.—Brown, 1s. 9d. per lb.
CANANGA.—Java, 9s. per lb.
CASSIA OIL, 80/85%.—4s. 9d. per lb.
CINNAMON OIL LEAF.—6s. 9d. per oz.
CITRONELLA OIL.—Java, 2s. 5d. per lb., pure, Ceylon, 2s. 5d. per lb., c.i.f. U.K. port.
LAVENDER OIL.—Mont Blanc, 38/40%, 10s. 6d. per lb.
PEPPERMINT OIL.—English, 55s. per lb.; Wayne Cty., 12s. 9d. per

# London Chemical Market

*The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

*London, August 14, 1930.*

THERE is nothing of special importance to report during the current week, trade having continued along quietly steady lines with very little alteration in values. Export business has been slightly better, and there is a greater volume of inquiry being received for some overseas markets.

## General Chemicals

ACETONE.—Demand has been of a fairly steady nature, and there is also a fair call on contract account. Price is firm at £71 10s. to £80 per ton according to quantity.

ACETIC ACID.—The market has now settled at the new prices and there is a fair amount of business passing. Price is firm at £36 5s. to £38 5s. for technical 80% and £37 5s. to £39 5s. for pure 80% delivered buyer's works in the U.K. according to quantity.

ACID CITRIC.—There is only a small demand and prices are unchanged at 1s. 6½d. to 1s. 7d. per lb. less usual 5% trade discount.

ACID LACTIC.—A somewhat better demand for the pale qualities, 50% by weight being quoted at about £41 to £42 per ton.

ACID OXALIC.—The market is fairly active with prices firm at £30 7s. 6d. to £32 per ton according to quantity.

ALUMINA SULPHATE.—A fair inquiry is being received and prices are unchanged at £8 to £8 15s. for 17/18% iron free quality.

ARSENIC.—Demand is still rather subdued and prices show no change at £15 15s. per ton free on rails at the mines.

CREAM OF TARTAR.—If anything a little more business has been passing and no further change is noticeable at about 88s. to 90s. per cwt. ex wharf London.

COPPER SULPHATE.—There is a fair trade passing with prices unaltered at about £21 to £22 per ton free on rails.

FORMALDEHYDE.—The market is steady at about £32 per ton and a regular demand is being received.

LEAD ACETATE.—Prices are steadier at £40 per ton for white and £39 per ton for brown with a slightly better demand.

LEAD NITRATE.—Only in quiet request at about £29 10s. to £30 10s. per ton.

LITHOPONE.—A steady trade is passing at £19 15s. to £23 per ton according to grade.

CARBONATE OF POTASH.—A better demand is being received, especially for 96/98% arsenic free quality, which is quoted at about £26 10s. to £27 per ton.

PERMANGANATE OF POTASH.—An improved demand is being received and the market is firm at about 5½d. per lb. for the B.P. needle crystals.

BICHROMATE OF SODA.—Unchanged at 3⅝d. per lb. with usual discount for contracts and there is a steady call.

SODIUM HYPOSULPHITE.—Rather a better demand has been received for photographic crystal quality, which is quoted steady at £14 15s. per ton, and commercial quality is only in quiet request at about £8 10s. per ton.

SODIUM SULPHIDE.—Unchanged at £10 5s. to £11 5s. per ton for the solid, and £11 5s. to £12 5s. for the broken according to quantity, carriage paid, at which prices there is a fair trade passing.

TARTAR EMETIC.—Unchanged at about 11d. per lb.

ZINC SULPHATE.—In a little better request at £12 10s. per ton.

## Coal Tar Products

Business in coal tar products still remains restricted, with little inquiry, and stocks are gradually being depleted. Prices, however, are being maintained.

MOTOR BENZOL.—Remains firm at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Unchanged at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Firm at about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL.—Remains at 3d. to 3½d. per gallon f.o.r. in the North, and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Unchanged at 2s. per gallon for the 98/100% quality, and at 1s. 10d. per gallon ex works for the dark quality 95/97%.

NAPHTHALENE.—Firelighter quality is being quoted at £3 10s. to £3 15s. per ton, the 74/76 quality at £4 to £4 5s. per ton, and the 76/78 quality at about £5 per ton.

PITCH.—Remains at a nominal price of 37s. 6d. to 42s. 6d. per ton f.o.b. East Coast port, with little inquiry.

## Nitrogen Fertilisers

*Sulphate of Ammonia.—Export.*—As a result of the successful outcome of the European producers' conference on nitrogen, the market presents a firmer appearance. The low offerings which have had a depressing effect have disappeared. The price now ranges from £6 15s. to £7 per ton f.o.b. U.K. port in single bags. *Home.*—Prices have not yet been announced, but it is understood that the scale will show a drop of about 10s. per ton on that in operation last year. In the meantime only small sales have been made.

*Nitrate of Soda.*—The prices announced in the U.K. on July 31 have taken the market by surprise, because a lower scale was expected. Merchants seem doubtful if the consumption can be maintained at these prices. But until sulphate prices are known it is impossible to have any definite views.

## Scottish Coal Tar Products

THERE is a continued steady demand for certain grades of creosote, but prices are unchanged. Trading in other products is on a small scale and prices are easy.

*Cresylic Acid.*—Unchanged with quotations easy. Pale, 99/100%, 1s. 9½d. to 1s. 10½d. per gallon; pale, 97/99%, 1s. 8½d. to 1s. 9½d. per gallon; dark 97/99%, 1s. 7½d. to 1s. 8½d. per gallon; high boiling, 1s. 9d. to 1s. 11d. per gallon; all at makers' works.

*Carbolic Sixties.*—Orders continue scarce, and value is nominal at 2s. to 2s. 2d. per gallon.

*Creosote Oil.*—Virgin oils are in fair demand, but other qualities are dull. Specification oil, 3d. to 3½d. per gallon; gas works ordinary, 3¼d. to 3½d. per gallon; washed oil, 3¼d. to 3⅝d. per gallon; all in bulk quantities ex makers' works.

*Coal Tar Pitch.*—Commanding very little attention. Value is about 45s. to 47s. 6d. per ton f.a.s. Glasgow for export and about 47s. 6d. per ton ex works for home trade.

*Blast Furnace Pitch.*—Controlled prices remain at 30s. per ton f.o.r. works for home trade and 35s. per ton f.a.s. Glasgow for export.

*Refined Coal Tar.*—Stocks are accumulating and quotations remain easy at 3¼d. to 3⅜d. per gallon in buyers' packages at makers' works.

*Blast Furnace Tar.*—Without interest at 2⅜d. per gallon.

*Crude Naphtha.*—Easy in tone with value about 4d. to 4¼d. per gallon f.o.r. works in bulk.

*Water White Products.*—Inquiries are scarce for all items. Motor benzole, 1s. 5½d. to 1s. 6d. per gallon; solvent naphtha, 90/160, 1s. 2½d. to 1s. 3½d. per gallon; heavy naphtha, 90/190, 1s. to 1s. 1d. per gallon; all free on rails works in bulk.

## Latest Oil Prices

LONDON, August 13.—LINSEED OIL was in moderate request at 15s. to 7s. 6d. per ton decline. Spot ex mill, £36; August, £32 10s.; September to December, £31 15s.; January to April, £30 2s. 6d., naked. RAPE OIL was quiet. Crude extracted, £34; technical refined, £35 10s., naked, ex wharf. COTTON OIL was firm. Egyptian, crude, £28; refined, common edible, £33; deodorised, £34 10s., naked, ex mill. TURPENTINE was steady, unchanged. American, spot, 33s. 6d.; September to December, 34s. 3d.; Russian, spot, 31s. 6d. per cwt.

HULL.—LINSEED OIL.—Spot, £34; August, £33 15s.; September to December, £32 10s.; January to April, £31 per ton, naked. COTTON OIL.—Egyptian crude, spot, £28; edible refined, spot, £31 10s.; technical, spot, £31; deodorised, spot, £33 10s. per ton, naked. PALM KERNEL OIL.—Crude, spot, £28 5s. per ton, naked, GROUNDNUT OIL.—Crushed/extracted, spot, £31; deodorised; £35 per ton. SOYA OIL.—Extracted and crushed, spot, £27 15s., deodorised, spot, £31 5s. per ton. RAPE OIL.—Crushed/extracted, spot, £34 10s.; refined, spot, £36 10s. per ton. TURPENTINE, CASTOR OIL and COD OIL unaltered.

## South Wales By-Products

THERE is scarcely any change in South Wales by-product activities. The demand for pitch remains slow and uncertain, stocks being heavily in excess of demand. Quotations are unchanged at from 44s. to 45s. per ton, f.o.b. Solvent naphtha continues to have a fair call at from 1s. 1d. to 1s. 3½d. per gallon, and a similar remark applies to motor benzol at from 1s. 3d. to 1s. 5d. per gallon. Heavy naphtha has scarcely any demand, quotations being unchanged at from 11d. to 1s. 1d. per gallon. Road tar has a steady, if moderate, call at from 10s. 6d. to 12s. 6d. per 40-gallon barrel. Creosote is dull at from 2½d. to 3⅜d. per gallon. Refined tars have a fair market, quotations for gasworks and coke oven tar being unchanged. Patent fuel and coke exports remain unsatisfactory although they are showing slight improvement.

# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

*Glasgow, August* 13, 1930.

THE market shows no sign of improvement, demands generally are poor, and prices are now admittedly competitive.

### Industrial Chemicals

ACETONE B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC.—Prices ruling are as follows:—Glacial 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical 80%, £36 5s. per ton, delivered.

ACID BORIC.—Granulated, £22 per ton; crystals, £23 per ton; powder, £24 per ton, packed in 1 cwt. bags delivered free, Great Britain, in 1 ton lots and upwards.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC 80° quality.—£23 per ton, ex station, full truck loads.

ACID OXALIC 98/100%.—On offer at the same price, viz., 3¼d. per lb., ex store. Offered from the Continent at 3⅛d. per lb., ex wharf.

ACID SULPHURIC.—£3 2s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC B.P. CRYSTALS.—Quoted 1s. 2d. per lb., less 5% ex wharf. On offer for prompt delivery from the Continent at 1s. 2¼d. per lb., less 5% ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton, c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton; powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID 880°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Rather easier, and spot material now obtainable at round about £29 per ton, ex wharf. On offer for shipment from China at about £27 per ton, c.i.f. U.K. ports.

ARSENIC, WHITE POWDERED.—Quoted £18 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £11 per ton, c.i.f. U.K. ports. For Continental material our prices would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. per ton to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS GREEN.—At about £3 15s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE 40%.—Now quoted £33 per ton, ex store. Continental material on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £33 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, c.i.f. U.K. ports.

LEAD, ACETATE.—White crystals quoted round about £39 to £40 per ton, ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE, GROUND CALCINED.—Quoted £9 15s. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality, 64 O.P., quoted 1s. 8d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4⅛d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer at £26 10s. per ton, ex store, offered from the Continent at £25 5s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £26 5s. per ton, ex wharf. Crystals, 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d per ton, c.i.f. U.K. ports Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb., ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb., ex wharf.

SODA, CAUSTIC.—Powdered 98/99%, £17 10s. per ton, in drums, £18 15s. per ton in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid buyers' station. Minimum 4-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3⅞d. per lb. delivered buyers' premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality 27s. 6d. per ton extra. Light soda ash £7 13s. per ton, ex quay, minimum 4-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum 4-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum 4-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Chilean producers now offer at £10 2s. per ton, carriage paid buyers' sidings, minimum 6-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices 55s. per ton, ex works, 57s. 6d. per ton delivered, for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £9 15s.; broken 60/62%, £10 15s. per ton. Crystals 30/32%, £7 17s. 6d. per ton, all delivered buyers' works on contract minimum 4-ton lots. Special prices for some consumers. Spot material, 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; Roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £20 per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £12 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

## Chemical Engineering and Flotation

### Two Important Blair Fellowships

THE Education Officer of the London County Council announces that Robert Blair Fellowships have been awarded to Mr. Cyril H. Bowden, St. Andrew's Road, Felixstowe, and to Mr. Philip Carpenter, "Withleigh," West Heath Road, London. These fellowships, which carry a grant of £450, are the most valuable scholarship awards in the gift of the London County Council.

Mr. Bowden proposes to study chemical engineering at the Massachusetts Institute of Technology, U.S.A. Mr. Carpenter proposes to visit mines in the U.S.A. to study the principles and practice of the flotation process for separating minerals from their ores with a view to investigating the value of its application on the large copper field now being opened up in Northern Rhodesia.

## I.G. Hydrogenation Patents

RECENTLY the Standard Oil Co., of New Jersey, acquired an interest in the hydrogenation patents of the German I.G. Farbenindustrie. An experimental hydrogenation plant was erected in Chicago and subsequently the Standard I.G. Co. was formed, which is jointly owned by the Standard Oil Co. and the I.G. Now a separate company is being organised to take over the rights to the hydrogenation process in the United States from the Standard I.G. Co. All American oil companies that can commercially use it will obtain a licence for the hydrogenation process to synthesise motor fuels and lubricants and will be required to subscribe to stock in the new company and pay a nominal royalty. The new company will in turn pay royalty to the Standard I.G. The Standard Oil Co. of New Jersey is constructing a hydrogenation plant at Bayway, New Jersey, and at Baton Rouge, Louisiana. Another hydrogenation plant is being erected at Baytown, Texas, for the Humble Oil and Refining Co., and at Sarnia, Ontario, for the Imperial Oil Co.

# Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, August 14, 1930.*

There has been a slight but welcome improvement in conditions on the Manchester chemical market during the past week, although it is probable that the spurt has been more or less relative after the marked slackness of Bank Holiday week. Fundamental conditions at the consuming end, however, are far from satisfactory, more particularly in the textile industry, the prospects of improvement in which seem to be as far away as ever. Slight easiness has to be recorded in respect of one or two sections of the market, but, on the whole, prices have been pretty well maintained and show little change on balance.

### Heavy Chemicals

Bicarbonate of soda keeps reasonably steady at about £10 10s. per ton, and a moderate business in this material is being done. Chlorate of soda, however, is moving in relatively small quantities, and at round £24 10s. per ton values are not too strong. There is a fair inquiry about for prussiate of soda, offers of which are held at from 4¾d. to 5¼d. per lb., according to quantity. Caustic soda is firm on a contract basis of £12 15s. to £14 per ton, according to strength, and a fairly active demand is reported. Saltcake has been in relatively slow request this week, with prices at from £2 15s. to £3 per ton. There is not much doing in the case of sulphide of sodium, and the tendency is easy if anything at about £9 10s. per ton for the 60-65 per cent. concentrated solid quality, and £7 15s. for the commercial material. Alkali meets with a quietly steady demand at round £6 per ton. Bichromate of soda continues to be offered at about 3½d. per lb., and moderate sales of this material are being effected. Phosphate of soda is steady, although only in quiet request at from £11 to £11 10s. per ton for the tribasic sort. There has been no change in the position of hyposulphite of soda, current quotations for which are at about £15 5s. per ton for the photographic grade, and £9 for the commercial.

There is a moderate amount of inquiry about for yellow prussiate of potash, and values are maintained at from 6¾d. to 7¼d. per lb., according to quantity. Carbonate of potash is maintained at £125 per ton, but buying interest in this section during the past week has been quiet. Permanganate of potash is selling in small quantities, with the B.P. grade quoted here at round 5¼d. per lb., and commercial quality at 5¼d. With regard to chlorate of potash, current demand is on restricted lines, although prices remain at about £26 per ton. Caustic potash is on the easy side at from £29 10s. to £30 per ton, and no big weight of business is being placed just now. Bichromate of potash meets with a fair amount of inquiry and values are maintained at about 4¼d. per lb.

Sulphate of copper is still easy and uncertain in tendency at round £22 10s. per ton, f.o.b., and only a relatively quiet trade in the material is going through. Arsenic seems to be reasonably steady at from £15 15s. to £16 per ton, at the mines, for white powdered, Cornish makes, but the demand shows little expansion. There is a moderate inquiry about in the case of the acetates of lime, with grey quoted at round £14 10s. per ton and brown at £7 10s. The demand for the lead products is rather quiet at £29 10s. per ton for nitrate and £36 and £35 per ton for the white and brown acetates.

### Acids and Tar Products

Acetic acid is maintained at the new levels of £47 to £51 per ton for the glacial, according to quantity, and £37 5s. per ton for the 80 per cent. commercial in ton lots, and a fair business is being done. Tartaric acid is displaying renewed weakness at from 1s. 0½d. to 1s. 1d. per lb., and only a quiet trade is being done. Citric acid keeps up fairly well at about 1s. 6½d. per lb., and a moderate amount of inquiry in this section is reported. There is not much doing in oxalic acid, but values are reasonably steady at round £1 12s. per cwt., ex store.

In the by-products section pitch remains more or less nominal at 47s. 6d. per ton, f.o.b., and actual demand is quiet. Creosote oil is in moderate inquiry, and steady at from 3d. to 4d. per gallon, naked, according to grade. Carbolic acid is perhaps a shade less steady at 7¼d. per lb., f.o.b., for crystals, and round 2s. 2d. per gallon naked for the crude 60's material. Solvent naphtha is in moderate inquiry at 1s. 2¼d. per gallon naked.

# Company News

International Nickel Co. of Canada.—The usual quarterly dividend is announced of 25 cents per share on the common stock, payable September 30 at the rate of 4s. 1½dl to the dollar.

Parent Coal Carbonisation Trust, Ltd.—An initia. report covering the period from the incorporation of the company (February, 1929), to May, 1930, shows that net development expenditure amounted to £41,288, and administration expenses to £7,561. Cash stood at £3,059. The first installation of plant for the low temperature carbonisation of coal by the company's secret process in this country has now been erected at Belvedere. It consists of two retorts, each having a capacity of 50 tons a day, and will be put into operation as soon as the power plant, which is now under construction, is completed. The board say that although inquiries for the supply of installations have been received from America, India, Australia, and other countries, they have refrained from entering into negotiations pending the working of the Belvedere installation, the success of which it is fully anticipated will be shown within the next few weeks.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal" have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

Austria.—An agent in Vienna wishes to represent British manufacturers of chemicals for foodstuffs (citric acid, syrups, etc.). Reference No. 147.

Portugal.—A firm of good standing in Lisbon wishes to secure the representation of a British manufacturer of aniline dyes. (Ref. No. 155.)

Turkey.—The Department of Posts, Telegraphs and Telephones is calling for tenders to be presented in Angora by September 15 for the supply of manganese dioxide and graphite. (Ref. No. B.X. 6084.)

Canada.—An Ontario firm manufacturing electric stoves is desirous of importing oven thermometers. (Ref. No. B.X. 6700.)

## Tariff Changes

South Africa.—A duty of 15 per cent. *ad valorem*, in addition to the ordinary duty of 5 per cent., has been imposed as from May 30 on "liquid disinfectants and disinfectant powders, in bulk, the active ingredients of which are derivatives of coal tar."

Germany.—As from August 1 the import duty on mineral oils of a density of more than 0·830 at 15° C. has been increased from 1·50 to 4 Reichsmarks per 100 kilogs.

### Canadian Sulphate of Ammonia Production

The Dominion Bureau of Statistics at Ottawa reports that the production of ammonium sulphate in Canada during 1929 amounted to 34,141 tons, valued at $1,293,953, as compared with 28,090 tons, worth $1,108,744, in 1928. All of the ammonium sulphate made in Canada is produced as a by-product of the coke and artificial gas industries. A large part of the Canadian production is exported to foreign countries for use as a fertiliser. In 1929 exports totalled 24,489 tons, worth $909,510, as compared with 13,632 tons, valued at $591,696, in 1928. The principal countries of destination with the quantities and values of Canadian export to each were as follows:—Japan, 10,095 tons, worth $375,020; United States, 6,857 tons, worth $220,734; Hong Kong, 2,155 tons, at $93,783; Barbados, 1,909 tons, at $81,460; China, 1,304 tons, at $50,434; other British West Indies, 822 tons, at $33,871; British Guiana, 546 tons, at $23,158; and Porto Rico, 302 tons, at $13,025.

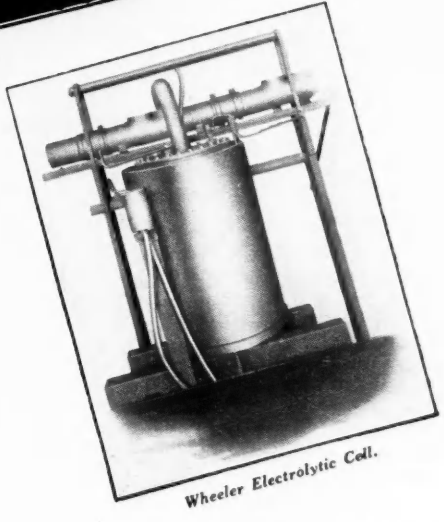
Some ammonium sulphate is imported into Canada. During 1929 about 1,723 tons, worth $80,019, were brought into Canada; the bulk of this came from the United States. In 1928 the imports were 3,510 tons, worth $174,899.

# SCOTT ELECTROLYTIC CAUSTIC SODA AND CHLORINE PLANT

COMPLETE INSTALLATIONS COMPRISING

Wheeler Plant, producing Ten Tons Caustic Soda Daily.

*BRINE PURIFICATION PLANT,*
*ELECTROLYTIC CELLS,*
*PATENT EVAPORATING PLANT FOR CELL LIQUOR,*
*CAUSTIC SODA FUSION AND PACKING PLANT,*
*BLEACH AND LIQUID CHLORINE PLANTS.*



Wheeler Electrolytic Cell.

*Sole Concessionaires for*
WHEELER PATENTS

**George Ernest SCOTT & Son [London] Ltd. & Company Limited,**

**Bradfield Road, Silvertown, London, E.16. Also at—19, Waterloo Street, Glasgow, C.2.**

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgment

*[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]*

DUDLEY CHEMICAL CO., LTD., Crown Buildings, James Watt Street, Birmingham, chemical manufacturers. (C.C., 16/8/30.) £36 18s. June 20.

## Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debt due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

ALPHA SYNTHETICS, LTD., London, E.C., chemical manufacturers. (M., 16/8/30.) Registered July 23, £125 debenture to A. P. Giron-Couland, 91, Westminster Palace Gardens, Artillery Row, S.W.; general charge. *Nil. December 31, 1929.

ANGELA NITRATE CO., LTD., London, E.C. (M., 16/8/30.) Registered July 24. Letter of Hypothecation, to British and South Pacific Trading Co., Ltd., 14, King William Street, E.C. securing all moneys due or to become due on any account to the charges; charged on existing and future stocks of nitrate iodine and general stores whether on board ship or on land or in Bariba Chili and agreement to charge any floating assets, etc. *Nil. May 9, 1929.

GRY-MOFF CO., LTD., Great Bridge, soap manufacturers. (M., 16/8/30.) Registered July 24, charge, to Bank; charged on land and premises at Scott Street, Horseley Heath, Tipton. *Nil. December 31, 1929.

RENTOKIL (SALES), LTD., London, E.C., disinfectant manufacturers. (M., 16/8/30.) Registered July 25, £141 10s. debenture, to A. J. Beech, 37, Great Tower Street, E.C.; general charge. *£200. October 21, 1929.

## Receivership

KODRYSO, LTD. (R., 16/8/30.) F. F. Sharles, of Salisbury House, London Wall, E.C.2, was appointed Receiver and Manager on July 26, 1930, under powers contained in debenture dated May 14, 1930.

## London Gazette, &c.

### Companies Winding Up Voluntarily

HUNGARIAN OIL SYNDICATE, LTD. (C.W.U.V., 16/8/30.) By special resolution, July 28. F. G. Hawley, Britannic House, Finsbury Circus, London, appointed as liquidator.

PEET AND CO., LTD. (C.W.U.V., 16/8/30.) By reason of its liabilities, August 1. H. A. Horsfield, 21, Forster Square, Bradford, incorporated accountant, appointed as liquidator.

COSCUTIS CO., LTD. (C.W.U.V., 16/8/30.) By reason of its liabilities, August 7. Major C. H. Nathan, chartered accountant, Norfolk House, Norfolk Street, Strand, W.C.2, appointed as liquidator.

### Partnership Dissolved

W. A. ATKINSON AND CO. (William Arthur ATKINSON and Hugh Estlin TAYLOR), dyers, Blaby Road, Glen Parva, by mutual consent as from June 30, 1930. Debts received and paid by H. E. Taylor.

## New Companies Registered

ACCESSORY FOOD FACTORS, LTD.—Registered as a "private" company August 8. Capital, £2,000 in 1,800 10 per cent. cumulative preference shares of £1 each and 4,000 ordinary shares of 1s. each. To carry on the business of manufacturers of and dealers in all kinds of food and ingredients of foods for animals, fertilisers and manures, oils, glue, yeast, soap, tallow, disinfectants and fats, etc. Directors: D. I. Witherington, High Lynch, The Edge, near Stroud, and Elsie M. Witherington.

HENSLOW'S FERTILISERS, LTD., 31, Craven Street, London, W.—Registered as a "private" company August 8. Capital, £400 in £1 shares. To acquire the business of a manufacturer of and dealer in fertilisers carried on by T. G. W. Henslow at 21, Craven Street, Strand, London, and also to carry on the business of analytical chemists, Directors: T. G. W. Henslow, M. L. Richardson, and J. Railton.

ORGANIC DERIVATIVES, LTD.—Registered as a "private" company, August 5. Capital, £3,500 in 3,300 5 per cent. non-cumulative preference shares of £1 each and 4,000 ordinary shares of 1s. each. To study, exploit and develop all organic matters; to carry on the business of by-product and chemical merchants, coal merchants, exporters and factors, shipbrokers and general agents, manufacturers of and dealers in shale, lignite, slack, peat, dross, refuse and carbonaceous, mineral, chemical and other substances and fuels, and the constituents, products of tar distillation, by-products and residuals of coal, chemical manures, fertilisers, dyes, tar, ammonia, chemicals, etc. The first directors are: S. C. K. George (permanent managing director and chairman) and W. E. Murphy. "South Stoke," Abbotswood, Guildford.

ALPH. SHARP AND CO., LTD., Copley Chemical Works, Wakefield Road, Copley, Halifax.—Registered as a "private" company August 9. Capital, £5,000 in £1 shares. To acquire the business of a chemical manufacturer carried on by Alphonse Sharp, at Copley Chemical Works, as "Alph. Sharp." Directors: A. Sharp, C. W. Sharp, and H. Pollard.

JOHN SMITH AND SON (HALTWHISTLE), LTD.—Registered as a "private" company, August 5. Capital, £100 in £1 shares. To carry on the business of manufacturers and merchants of paints, colours, varnishes, enamels, anti-fouling compositions, special protective paints, bituminous paints, quick drying zinc and tallow compounds, copper paints, cellulose products, oils, tar, pitch, resin, chemicals, etc. Subscribers (each with one share): D. Smith, Great House, Newcastle-on-Tyne, and A. S. Wood.

WILCOCK AND CO. (CHURCH), LTD., 16, Bridge Street, Church, Lancaster, registered as a private company, August 7. Capital, £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in synthetic resin, chemicals and chemical compounds and all substances necessary for the manufacture of paints and varnishes, etc. Directors: W. W. Cocker and Mrs. M. E. Cocker.

### International Nickel Programme

THE copper production of International Nickel Mines during the fourth quarter of the current year, it is reported from Toronto, will be nearly three times as great as the average of 1929, and the out-turn of nickel will be increased approximately 60 per cent. In October it is expected that the mines of this company will be yielding copper at the rate of about 240,000,000 lb. annually, or a value of nearly 29,000,000 dol. per year. This estimate is based on an average price of 12c. per lb. for copper. The production of nickel is expected to reach a rate of 180,000,000 lb. annually, commencing in October. Taking 27c. per lb. as the approximate value, the yield of nickel will be about $49,000,000 annually. In addition, the production of precious metal will be at the rate of $6,000,000 annually. This will be made up of about $4,000,000 in metals of the platinum group, $1,000,000 in gold and $1,000,000 in silver.

### New French Acid Plant

THE Service des Poudres is constructing at Saint-Chamas, France, a new plant for the manufacture of sulphuric acid by the gypsum process. The sulphuric acid production of this new installation is eventually to serve in the production of sulphate of ammonia.